The Soybean Digest

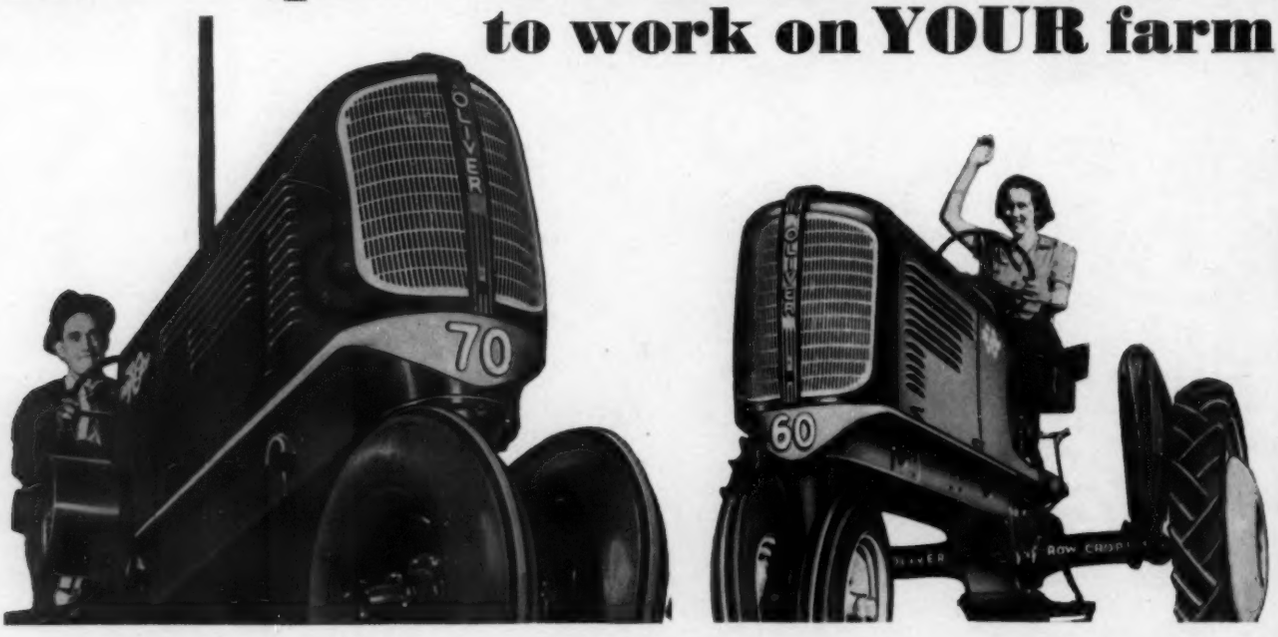
Official Publication

OF

THE AMERICAN SOYBEAN ASSOCIATION

VOLUME 1 · NUMBER 11 · SEPTEMBER · 1941

How to put POWER and ECONOMY to work on YOUR farm



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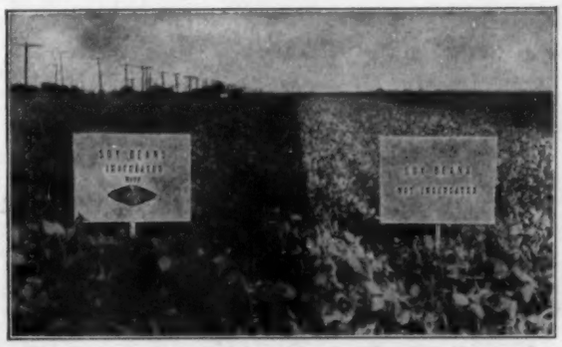
INOCULATION FOR SOY BEANS



EFFECT OF INOCULATION ON SOY BEANS

Treatment	Yield	Pounds Protein per ton	
	Seed	Seed	Hay
Inoculated	46.6 bu.	705	316.2
Not Inoculated	34.7 bu.	621	292.4
Gain for Inoculation	11.9 bu.	84	23.8

(University of Illinois Bulletin No. 310)

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THE *Soybean Digest*

VOL. I SEPTEMBER · 1941 No. 11

IN THIS ISSUE

	PAGE
The 1941 Convention . . . A Big Success	3
Resolutions . . . Reports	4
The A. S. A. Field Day at Ames	5
Soy Meal Comes Into Its Own	6
Regional Lab Winds Up First Five Years	7
It's the Calcium — Not the Alkalinity	8
The New Soybean Grades	9
Editorials	10
Ford Develops Soy Upholstery Fiber	12
Processors Must Concentrate on Bland Oil	14
Farmers Resent Market Fluctuations	16
Equipment Industry Looks at Soybean	20
Market Summary	24

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The New Officers

Left to right: David G. Wing, President, Mechanicsburg, Ohio; Ben Edmondson, Treasurer, Clayton, Ind.; and George M. Strayer, Secretary-Editor, Hudson, Iowa. Joe Johnson, Champaign, Ill., Vice-President-elect, is not shown in the picture.

The 1941 Convention . . . a Big Success

FARMER rubbed elbow with industrialist, and research man with processor at the twenty-first annual convention of the American Soybean Association in Ames and Des Moines, Ia., September 12 and 13.

Delegates seemed to be unanimous about three things:

1. **This was an outstanding convention.**
2. **The American Soybean Association has made great strides forward in the past year.**
3. **Soybean prices were too high. (They may not be when you read this.)**

The Hotel Fort Des Moines, the Iowa State College, and the Des Moines Convention Bureau did everything in their power to make the convention a pleasant one.

J. S. Russell of the Des Moines Register and Tribune; Frank Nye, Jr., of the Iowa Daily Press Association; Charley Stookie of the Columbia Broadcasting System; Dick Hull of WOI; Sam Reck of Iowa State College; Andy Woolfries of KRNT; Herb Plambeck and Mal Hanson of WHO; Ivan Campbell of the Cotton and Cotton Oil Press; and Art Thompson of Wallaces' Farmer saw to it that the public knew about the convention.

Serious Talk

Wherever delegates gathered, there was talk of grave issues. On the first night of the convention the air was heavy with Charles (Roosevelt-the Jews-and the British) Lindbergh's Des Moines speech.

But all this did not deter delegates from concentrating on a fine, well-rounded program, in which the soybean was king from start to finish.

The successful inauguration of the *Soybean Digest* during the past year was very popular with delegates. Several speakers and a convention resolution commended the *Digest*. Delegates agreed that it is up to the industry to wholeheartedly cooperate in insuring the future of this trade organ by making it a financial success.

The two principal speakers—R. J. Goode and C. V. Gregory—were very well received. Goode, former Alabama commissioner of agriculture, made a stirring appeal for elimination of trade barriers. Gregory, associate publisher of Wallace's Farmer and Iowa Homestead, urged support of the U. S. D. A. "Food will win the war and dictate the peace" program.

A Few Convention Highlights:

Dr. T. H. Hopper, director of the regional laboratory at Urbana, Ill., announced the finding by the laboratory that a weak alkaline solution is the most efficient for extracting protein from soybean oil.

Donald Ramseyer of the Ford Motor Company reported successful tests for an upholstery fabric containing 30 per cent soybean protein fibers.

Dr. Martin G. Weiss of Iowa State College reported successful hybridization for lodge resistance, yield, drying quality of the oil.

Dr. W. A. Albrecht of the University of Missouri reported that the presence of calcium in the soil is more important than pH as a requisite for formation of root nodules in legumes.

Dr. L. K. Arnold of Iowa State College urged the establishment of community-sized soybean crushing plants of the solvent type.

Walter Flumerfelt of the Soybean Processing Company, Waterloo, Iowa, anticipated closer attention by processors to grades as a result of higher level of bean prices.

Lamar Kishlar of the Ralston-Purina Company, St. Louis, reported a bright year for soybean oil, partially as a result of a small cottonseed crush.

Discussions by some of the speakers appear elsewhere in this issue. Others will be printed next month.

David G. Wing, Mechanicsburg, Ohio, was elected president of the Association; Joe Johnson of Champaign, Illinois, vice-president; George M. Strayer, Hudson, Iowa, secretary-editor; and Ben Edmondson of Clayton, Ind., treasurer.

Glen G. McIlroy, Irwin, Ohio, the retiring president, was named director of the association for Ohio.

Other state directors include Ersel Walley, Fort Wayne (Indiana); Howard Roach, Plainfield (Iowa); Stuart D. Ormsby, Bellville (New York); John Dries, Saukville (Wisconsin); and Jacob Hartz, Stuttgart (Arkansas). Additional state directors will be named during the fall.

—sbd—

BUSINESS MEETING

THE annual business meeting of the American Soybean Association was called to order in the Grand Ball Room of the Hotel Fort Des Moines at 2 o'clock Saturday, September 13, 1941, by David G. Wing, Vice-president of the organization, who presided in the absence of the president, G. G. McIlroy.

Mr. Wing called on J. B. Edmondson, Secretary-Treasurer, for a report of the work of the organization for the past year.

George M. Strayer gave a financial report of *The Soybean Digest* and also a summary of circulation.

A detailed financial report of the Association was given by Mr. Edmondson.

Mr. Edmondson moved that these reports be accepted as read. The motion was seconded and carried.

Mr. Wing called for a report of the Resolutions Committee. Mr. J. C. Hackleman, chairman of the committee, presented the resolutions for 1942. Mr. Hackleman moved these be accepted. The motion was seconded and carried.

The Nominating Committee presented the following names for officers of the American Soybean Association for 1942: David G. Wing, Mechanicsburg, Ohio,

(*Continued on page 4*)

President; J. E. Johnson, Champaign, Illinois, Vice-president; Geo. M. Strayer, Hudson, Iowa, Secretary and Editor; J. B. Edmondson, Clayton, Indiana, Treasurer; and State Directors, G. G. McIlroy, Irwin (Ohio); Ersel Walley, Fort Wayne (Indiana); Howard Roach, Plainfield (Iowa); Stuart D. Ormsby, Bellville (New York); John Dries, Saukville (Wisconsin); Jacob Hartz, Stuttgart (Arkansas). Moved by Beeson that the committee report be accepted and that a unanimous ballot be cast for the nominees. Seconded and carried.

Don Walker, Circleville, Ohio, made a motion that the board of directors be empowered to decide where the 1942 annual convention should be held, and that they also be instructed to make all necessary arrangements. The motion was seconded and carried.

The presiding officer called for new business.

The suggestion was made that we appoint a committee in each state to secure memberships. There was discussion. It was also suggested that a section in each issue of *The Soybean Digest* be devoted to food and edible uses of soybeans.

Moved by J. C. Hackleman, seconded by Don Walker that the meeting be declared adjourned.

RESOLUTIONS

The following report of the Resolutions Committee was adopted by the convention:

1. Since the 1941 meeting of the American Soybean Association has been highly successful, be it resolved that the Association extends its thanks to all those participating in this program. It wishes further to commend the constructive work of the Regional Soybean Industrial Products Laboratory and the various state experiment stations in their efforts to continue the development of the soybean industry. The Association further wishes to convey its thanks to the City of Des Moines, and to the staff of Iowa State College for their efforts in making arrangements for the 1941 meeting.

2. We wish to especially commend the accomplishments of our executive secretary, George M. Strayer, for his untiring efforts in developing *The Soybean Digest*, which has in the short space of ten months become an influential trade paper, as well as a valuable educational medium for carrying on the work of the Association.

3. Inasmuch as two of the most active officers of our Association who have served the Association untiringly for several years are retiring from active participation in the management of the Association we wish to especially commend Mr. G. G. McIlroy, retiring president, and Mr. J. B. Edmondson, secretary-treasurer, for their untiring efforts in behalf of the Association.

4. Inasmuch as the soybean industry has suffered an irreparable loss through the death of two pioneers in the processing industry, Mr. H. G. Atwood, president of Allied Mills, and Mr. A. E. Staley, Sr., of Staley Mfg. Company, in our loss we wish to voice our deepest regrets and express to their families and to their organizations the unending gratitude of the soybean growers of America for the invaluable service they have rendered.

5. Recognizing the valuable educational assistance to the soybean industry rendered by the B. & O. Railroad through the operation of its soybean train through the states of Ohio, Indiana and Illinois, we gratefully acknowledge our thanks. The subsequent use of the splendid exhibit material carried on the train is rendering valuable and effective service to the soybean growers of the United States.

We further express our appreciation for the continued assistance to the industry by other railroads in making available exhibit panels and other materials featuring soybeans and their utilization.

6. We wish to extend our appreciation to the many industries who have given financial support in the form of advertisements in *The Soybean Digest*. This support has made possible the presentation of the publication to thousands of interested parties throughout the United States and foreign countries.

7. In view of the impending possibility of the depletion of the stocks of fats and oils in this country,

Be it Resolved, That the American Soybean Association urge its Legislative Committee to continue the work of collaborating with the dairy and vegetable industries in the promotion of a greater production and distribution of domestic fats and oils in the United States, and a more complete utilization of the by-products from oil producing crops.

W. J. MORSE.
JOHN P. DRIES.
J. B. EDMONDSON.
J. C. HACKLEMAN.

SECRETARY'S REPORT

I feel that it will not be necessary or advisable for one to give an extended report this afternoon. Those of you who have been reading *The Soybean Digest* from month to month during the past year are doubtless familiar with the work and policies of the organization.

In reviewing the year's work, however, I feel that the greatest step forward has been the launching of *The Soybean Digest* as a monthly periodical. When this project was first considered at the meeting last year, it loomed up as a stupendous undertaking. Considerable courage and optimism was required to convince ourselves that this thing could be done successfully.

We have reached the first milestone. Under the management of our Executive Secretary, the soybean public has been given a paper that is highly creditable both to the Association and to the soybean industry. The workmanship is of the highest quality and the editorial policy sound and reasonable.

Yet this enterprise is not entirely past the venturing stage. We are still in the woods and could very easily get lost even yet. As you will note in the financial reports, *The Soybean Digest* has not been self supporting during the past year. This was anticipated and is not at all surprising, since it is no child's task to successfully break into the highly competitive journalistic field today unless very strong and definite support is at hand. In spite of the efforts of the management to secure sufficient advertising to elevate the paper to a self supporting basis, the Association has had to make up a deficit of around $2000 during the year. We must face the fact, too, that when our Executive Secretary was employed last year, it was on a half time basis. Since he has had to spend very much more than that allotted time, we cannot expect this arrangement to continue indefinitely; so unless the Association can obtain some financial support as yet uncovered, the entire enterprise has a grave chance of bogging down. We do not believe the soybean industry, either the growers or industrial interests, would be satisfied to see this project fail without making an effort to prevent it. Past history has clearly demonstrated to me that farmer support alone is far too weak and unreliable to meet the needs of the present situation, and the Association has no other alternative than to seek the added cooperation of industrial groups.

Judging from the correspondence and the number of inquiries that have come to the secretary's office during the past year, interest in soybeans is continuing to spread to all classes of people and to many parts of the North American Continent. Literature has been sent, gratis, to several countries in South America, to Mexico, Canada, China, Australia, England, and South Africa. The plea for information on soybean culture and utilization is much the same everywhere. Many students in universities write for information to assist them in presenting papers, writing theses, etc. on this sub-

AMERICAN SOYBEAN ASSOCIATION

September 13, 1941

FINANCIAL REPORT

Receipts

Balance on Hand August 17, 1940	$1,254.30
Membership Receipts—	
Active Members	272.10
Associate Members	720.00
Receipts from Proceedings Sold	10.00
Received from G. G. McIlroy, Balance from Printing 1940 Proceedings	818.25
Final Dividends from Closed Bank, Champaign, Ill.	
Forwarded by Dr. W. L. Burlison (undeposited)	1.92
Total Receipts	$3,076.57

Disbursements

Postage	$ 61.00
Travelling Expenses (Officials)	110.18
Expenses of Dearborn Meeting	77.28
Expenses of Offices of President and Secretary	94.27
Cost of Publishing *Digest*, including Salary	2,020.72
Stenographic Help, Secretary's Office	48.80
Stationery and Letterheads	59.89
Miscellaneous Expenses	15.13
Checks unreturned at time of balance	54.20
Total Expenditures	$2,541.47
Balance on Hand September 13, 1941	$ 535.10
Balance on *Soybean Digest* account, September 1	194.67
Total Balance	$ 729.77

ject. The Association is glad to furnish this material. *The Soybean Digest* has been of great assistance in supplying this information.

The soybean is in the limelight today. As has been true in so many other instances, the peculiar qualities of this crop equip it to fit into many special needs. In this time of national stress, vast stores of soybeans are needed to promote our gigantic national defense program. For that reason every means are being employed to encourage farmers to harvest for grain as many soybeans as possible this fall. The result will doubtless be a record breaking production in this country for 1941.

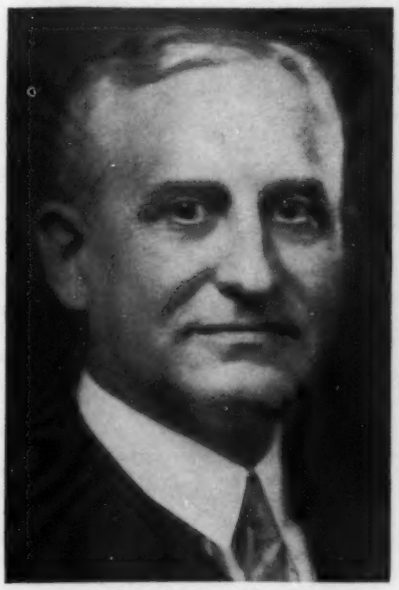
It is too early to forecast the conditions that may exist at seeding time next spring, but it may not be amiss to suggest that farmers should study their cropping programs pretty carefully, as well as the current world situation next spring before diverting too large a per cent of their crop acreage to soybeans. Many things can happen in a very short time. Aside from the patriotic consideration of supplying what the country needs during this crisis, it is certainly logical for farmers to recall how easily crop surpluses, with devastatingly low price, can be developed in this very productive and enterprising country of ours. Today is not a time to allow temporarily high market quotations to throw the farm rotations too far off balance.

As a final word, allow me to urge all of you who are interested in seeing the present program of the Association continue to develop, that you give this matter some clear, constructive thinking. A definite, workable plan must be formulated that will provide sufficient means for this development in the future.

J. B. EDMONDSON,
Secretary-Treasurer.

—sbd—

PIONEER SUCCUMBS



H. G. Atwood, president of Allied Mills, Inc., who died early this summer. So much faith did Mr. Atwood have in the soybean that he contracted for 50,000 acres at $1.45 per bushel in order to establish it in Illinois. Resolutions at the A. S. A. convention honored Mr. Atwood and Mr. A. E. Staley, Sr., who died last fall. The January Digest carried a story on Mr. Staley.

THE A.S.A. FIELD DAY AT AMES

A section of the crowd (top) at the American Soybean Association field day at the Iowa State College Agronomy farm September 12. With his mike to the breeze (left center) Martin G. Weiss, collaborator of the regional soybean laboratory, explains the hybrid plots, as, hands on hips, Ben Edmondson, A. S. A. treasurer, weighs the findings. At bottom, left to right, Dr. W. A. Albrecht, of the University of Missouri; Geo. M. Strayer, Secretary-Editor of the A. S. A.; Walter Plumerfelt, manager of the Soybean Processing Company; David G. Wing, President-elect of the A. S. A.; Dr. Weiss; and Dr. W. J. Morse of the United States Department of Agriculture, gather around the speakers' table in Great Hall, Memorial Union.

Soy Meal Comes Into Its Own

By NELSON P. NOBLE
Manager, Swift & Company, Champaign, Ill., Plant

NELSON P. NOBLE

I used to work for a man who was an outstanding authority on the fats and oils market, but whenever anyone would try to get him to commit himself on whether the price of fats and oils was due to advance or decline he had a standard answer. If prices did not advance or decline they would remain at about present levels. That is my position discussing the outlook for soybean oil meal. I will not attempt to prophesy on the future market for soybean oil meal, but will try and give you data on the sale of this product, which may contain some thought that will be helpful to you in your thinking about this very important product of soybeans.

The latest figures available on the consumption of soybean oil meal indicate that the crop year 1939-1940, 95 percent of all the soybean oil meal produced was fed to livestock, most of it as an ingredient in mixed feed, while only 5 percent was used for industrial purposes, such as the manufacture of glue and plastics. Therefore, since such an overwhelming percentage of the volume is used in livestock feeding, I will confine my remarks to the sale of soybean oil meal, for this purpose, and leave the discussion on the other 5 percent to persons more qualified.

The supply of soybean oil meal, compared with the principal competing meals for the past six years, is listed in the table at the bottom of this page.

The average of the five years which are complete, 1936-40 inclusive, indicates that an average total of 3,530,200 tons of interchangeable protein concentrates was disposed of each year, while for the year 1941 and 1942, best average estimates to date, indicate that there will be a supply of protein concentrates as follows:

ESTIMATED SUPPLY — 1941-42	Tons
Soybean	1,810,000
Cottonseed	1,750,000
Peanut	116,000
Linseed	590,000
Copra	180,000
Total	4,446,000

These figures indicate that if the crop turns out about as estimated by the Government on August 1, and if about the same proportion of the crop is crushed, and if the carry-over is about the same as last year, the total supply of protein concentrate next year will be slightly larger than last year. But since a larger and larger proportion of the crop is being crushed in recent years, it is likely that the total supply of protein concentrates will be considerably larger than in 1941 — say, 10-15 percent larger.

It looks like an enormous job to merchandise 95 percent of the above totals for use in livestock feeding, but analyzing the situation a little further, we find that this simply means that we must do a better selling job than we have done to date, and it can be done. Just to give you some idea of the potential market that is still to be reached, we recently worked up some figures based on the 1940 estimates of the United States Department of Agriculture on the livestock population of the country. Based on the minimum protein requirements that should be fed for good results, and over the normal feeding period, a summary of the figures for the United States is as follows:

	Number Livestock on Farms	Minimum Requirements Concentrate per day	Average No. Days Feeding	Tons Potential Concentrate Consumption Yearly
Dairy Cattle	25,334,000	2 lbs.	300	7,582,200
Beef Cattle	37,243,000	2 lbs.	100	3,724,300
Sheep	49,441,000	¼ lb.	100	611,654
Hogs	58,258,000	½ lb.	180	1,750,086
	170,276,000			13,668,240

Thus we see that the potential market for protein concentrates is around 13,000,000 tons a year, while the average production of all protein concentrates so far has not exceeded 4,000,000 tons a year. This 13,000,000 tons does not include any protein which should be fed to nearly 15,000,000 head of work stock. It can, therefore, be easily demonstrated that there is still room for a greatly increased consumption of soybean oil meal in livestock feeding channels.

Now let us take a look at the relative selling price of soybean oil meal as compared with its principal competitor, cottonseed meal. We find that for the 5 years, 1936-40 inclusive, the average price of 41 percent Protein Soybean Oil Meal, F.O.B. Decatur, as compared with the price of 41 percent Protein Cottonseed Meal at Memphis, was as follows:

	Soybean Oil Meal	Cottonseed Meal	Amount over or under Cottonseed Meal
1936	$29.09	$26.73	+ 2.36
1937	34.75	30.43	+ 4.32
1938	23.52	21.85	+ 1.67
1939	24.50	24.00	+ .50
1940	24.87	28.01	— 3.14

Sold at Premium

It will be noted that soybean oil meal, four years out of the five, sold at a premium over cottonseed meal, but during 1938 and 1939 this premium decreased and in 1940 Soybean Oil Meal sold at a $3.14 discount under cottonseed meal. For a product which is in every way equal and for some uses superior to cottonseed meal this is wrong, and in my opinion indicates a poor selling job on the part of the processors, caused in part by the fear that they are not going to be able to dispose of their meal because of the constantly increasing volume of soybeans grown and the increased competition of expanding and new processing facilities, and by other sales and production problems.

The SUPPLY of Leading Oil Meals

TONS — 000 OMITTED

Year Ending	Soybeans (2)	Cottonseed (1)	Peanut (2)	Linseed (2)	Copra (2)
1936	619.9	1,930.0	49.8	263.5	134.2
1937	548.0	2,121.0	69.0	273.4	141.3
1938	732.7	2,785.0	52.1	177.0	123.3
1939	1,053.7	2,228.0	75.9	202.6	132.4
1940	1,299.2	2,022.0	40.0	393.4	183.5
1941	1,325.0	2,032.0 (3)	135.0 (3)	600.0 (3)	180.0 (3)
Avg. 1936-40	850.7	2,217.2	57.4	262.0	142.9

(1) Y.E. 7/31, Includes stocks on hand Aug. 1 plus production and imports, minus exports.
(2) Y.E. 9/30, Production plus imports and minus exports.
(3) Estimate.

Source: U. S. Department of Agriculture — Bureau of Agriculture Economics

Regional Lab Winds Up 5 Years

By DR. T. H. HOPPER
Director U. S. Regional Soybean Industrial Products Laboratory

THIS year marks the fifth anniversary of the establishment of the U. S. Regional Soybean Industrial Products Laboratory for research into the industrial utilization of soybeans and soybean products. The objectives of the original program were broad and there has been no need of alteration of the plan. Progress on some phases of the work has been described to this Association on previous occasions, but has been presented in more detail in over 80 technical and general papers published in technical and trade journals.

The soybean is a complex organism and contains all the constituent compounds and elements essential to initiate growth of a soybean plant. In order that increased industrial utilization of the soybean and soybean products may be had and maintained economically in the highly competitive industrial field, it is essential that we learn the fundamental chemical and physical properties of the constituent compounds, particularly of those occurring in the larger amounts. A few illustrations may serve to show the importance of the more fundamental type of studies made by this laboratory.

Protein Extraction

The studies on protein dispersion in water solutions of various salts, alkali, and acids have shown that water and alkali solutions of moderate concentrations are very satisfactory agents for the dispersion and extraction of soybean protein from soybean meal. The weak alkali solutions will extract up to 95 per cent of the protein present. The lowest dispersion of the soybean protein was found in an acid solution having an acidity of approximately pH 4.2.

These studies gave a basis for a process by which soybean protein may be extracted from the meal and subsequently precipitated and freed from the sugars and other soluble materials extracted with the protein. The precipitated protein may be separated from the solution from which it is precipitated, carefully dried, and later modified for use, principally for adhesive uses for which it is, in general, the equivalent of milk casein.

Saturation Tests

Studies of the constitution of the soybean oil glycerides indicate that the processes of nature are quite regular. The percentages of saturated acids in the oil do not appear to vary much from 14 per cent, in fact the amounts of these acids seem to be almost constant. Further examination of the oils indicates that with variation in the iodine number, or total unsaturation, there is a quite regular change in the percentages of the unsaturated acids. With an increase in the iodine number there is a regular increase in the percentages of linoleic and linolenic acids and a decrease in the percentage of oleic acid. A soybean oil having an iodine number of 120 was observed to contain approximately 37 per cent oleic, 43 per cent linoleic, and 2 per cent linolenic acids. One having an iodine number of 143 was observed to contain approximately 19 per cent oleic, 57 per cent linoleic, and 6 per cent linolenic acids. This difference in iodine number of 23 points represents a decrease of 18 in per cent of oleic acid and increases of 14 in per cent of linoleic and 4 in per cent of linolenic.

DR. T. H. HOPPER

We are checking a larger number of samples having a wide range in iodine number to evaluate statistically the regularity with which these relations occur. With these relations between the iodine number and the percentages of the constituent fatty acids in soybean oil, a fairly accurate picture of the fatty acid composition of an oil may be had by merely determining the refractive index of the oil. The laboratory has determined the statistical relation between the iodine number and the refractive index for normal soybean oils.

Oil Varietal

The agronomic investigations have indicated that the percentages of carbohydrate, nitrogenous, lipid, and mineral constituents of the soybean are influenced by the physiological vigor of the plant as controlled by the environment during the entire growth period. In general, the oil content of the soybean seed is most specifically a varietal characteristic. That is, variations due to variety are greater than those caused by differences in environment. This most likely results from the fact that the influence of adverse environment during the period of the development of the seed causes abortion of ovules with the result that the plant adjusts the number of seeds it will develop and mature to its physiological resources. Through this process the soybean plant tends to produce seed in size and of oil content characteristic of the variety irrespective of the growth conditions. *The iodine number of the oil in soybeans is about equally influenced by variety and climatic factors of environment. High temperatures during the oil-formation period depress the iodine number and low temperatures raise it.*

The exposure tests on paints made with different kinds of oil have now covered a period of four years. In these paints, three oil vehicles were compared, namely, soybean oil alone, linseed oil alone, and soybean and perilla oils mixed in equal proportions. Three proportions of oil vehicle were used in the paints, namely, 28, 38, and 48 per cent. Lead-manganese drier was used in every case. Four ratios of zinc oxide to basic carbonate of lead were used, namely, 10-90, 20-80, 30-70, and 40-60. The results of the tests show that paints made with soybean oil alone or with blended soybean and perilla oils, when correctly formulated with proper pigments and driers, are equal in durability to similarly formulated linseed oil paints, even when the paints are dried on the very short schedule of only 24 hours between coats.

Plastics Improved

Improved plastics of the phenolic-resin type containing as much as one-third soybean meal have been made in the laboratory. These have water absorptions as low as 0.5 per cent and other desirable properties. Soybean meal is now being used commercially in combination with phenolic resins by several plastic molding powder manufacturers. Improved impact strength and low water absorption are claimed for the articles made from these molding compounds.

Very definite progress is being made in the studies on fractionation of soybean oil so as to obtain a portion having superior drying and film-producing properties. It is hoped through this research and its industrial application that shortages in imported drying oils (tung, linseed, perilla, and oiticica) may be met by these superior fractions of domestically-produced soybean oil.

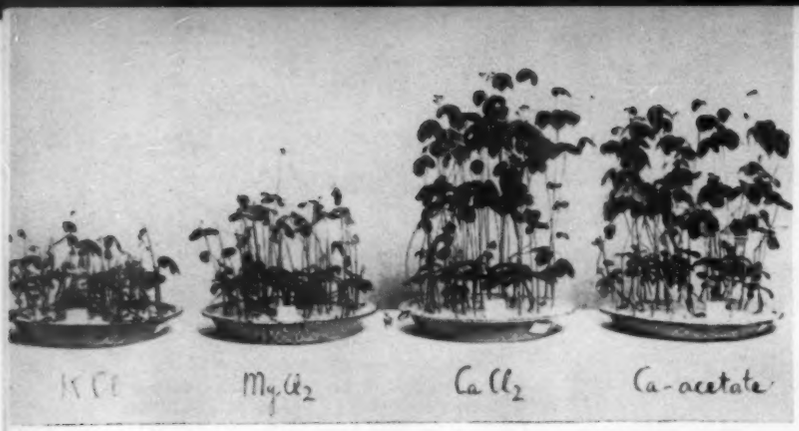
535 Visitors

The laboratory serves as a center where the problems of soybean processing and of using soybean oil and meal may be discussed. During the past two years the laboratory has been visited by 535 persons, individually and in groups. A large portion of these have been technical men from the industry interested in discussing technical problems relative to soybeans and soybean products with members of the staff of the laboratory. Recently the technical visitors' interest has been largely in connection with the production of soybean protein for use in adhesives.

Available time has permitted only a brief mention of part of the work of the U. S. Regional Soybean Industrial Products Laboratory. Work is being continued on all lines of the original program. The expected future developments, if realized, would assure a large increase in the use of soybeans for industrial purposes.

—•bd—

Production of fats and oils from domestic materials, totaling nearly 9 billion pounds, set a new high record in 1940. Lard, greases, tallow and linseed and soybean oils accounted for most of the gain in output over that of 1939. Domestic consumption was expanded moderately to reach 9.8 billion pounds, a new record.



"It was readily demonstrated that calcium was more important than magnesium or potassium in the early life of the soybean plant."

It's the Calcium . . Not the Alkalinity

● ***Missouri tests belie old beliefs about legumes***

By DR. W. A. ALBRECHT
University of Missouri

NORMAL development of plants, like any other growth performance, is distinctly a matter of proper nutrition. Nodule production on the roots of the soybean plant, and its use of nitrogen from the atmosphere to let this crop serve as a protein-producing, and a nitrogen-fixing factory on the farm, are determined in the main by the nutritional levels or the fertility conditions of the soil.

Of the 14 chemical elements required to construct plants, 11 must be supplied by the soil in case of the non-legumes. One less, or 10 are demanded from the soil by the legumes. The legumes, in the same manner as the non-legumes, use carbon, hydrogen and oxygen provided by air and water. In addition, and quite different from the non-legumes, they can take a fourth nutrient—nitrogen—from the air provided they are operating in cooperation with the proper bacteria on their roots commonly supplied as inoculation.

Forgotten Ten

Much of the attention to the behaviors of legume plants and their accompanying bacteria has centered about the fact that legumes can draw, on the weather, as it were, for four of their nutrient requirements, while non-legumes are limited to three. Little attention has gone to the fact that legumes must still obtain 10 (possibly more) nutrient elements from the soil. *Demand made on the soil by the legumes for these elements is greater than by the non-legumes because the mineral contents of legume forages are of higher concentrations.* These demands are more significant because on these increased mineral contents drawn from the soil fertility store there depends the effectiveness with which the root nodule producing bacteria will work.

Because the soybean can go, via bacteria, to the atmosphere for its nitrogen supply, we must not fix attention so completely on this escape from one responsibility as to forget the 10 others that still lie in the soil. Studies to date have not given sufficient importance to all the soil-borne plant nutrients as these influence inoculation, nodule production and nitrogen fixation by legumes. Critical attention has gone to some, namely: calcium, phosphorus, magnesium and potassium, the four most prominent in the soil fertility list. Consider the importance of these in connection with the soybean.

Calcium

Since long ago the art of agriculture has been pointing to the need for lime by many soils if they are to grow legumes. Nodulation of soybeans is generally improved by the practice of liming. It is only recently that science has begun to understand the function of liming for better cooperation between the plants and the bacteria. The scientists' first suggestion as to the role of liming soils in giving better legume growth was that lime was effective because it removed soil acidity.

This explanation is about to lose its adherents, in the face of the accumulating evidence that liming serves because it supplies the plants with calcium, one of the foremost soil requirements for both legumes and non-legumes.

Legume bacteria, too, have been considered sensitive to soil acidity. Failure of inoculation has often been ascribed to injury to the bacteria by the soil sourness. Successful inoculation, or ample nodule production, however, involves more than the idiosyncracies of the plant and bacteria. It involves, most decidedly, the soil as it nourishes both of these properly and sufficiently to make their joint activities result not only in a crop of larger tonnage but one of increased concentrations of proteins and minerals.

Since the soybean must be provided with its specific nodule bacteria when seeded on a soil for the first time, naturally the practice of inoculation of the seed is a recommended one. Failure of inoculation to produce nodules in many instances has brought blame on the bacterial culture, which, like water over the wheel, was past recovery or beyond defense when once distributed throughout the soil. It seemed a logical hypothesis that defective plant nutrition because of soil fertility deficiency might be prohibiting effective inoculation.

Calcium Role Checked

In order to test the nutritional value of liming for the soybean plants as compared to the role of lime in neutralizing soil acidity as these two effects encouraged better nodulation, calcium as a chloride was drilled with soybeans in comparison with similar drilling of calcium hydroxide. *Though the latter neutralized soil acidity while the former did not, both treatments brought about effective nodulation, deeper green color, and larger plants of more stable cell structure.* The nodules were not necessarily located in the soil areas into which the calcium compound was deposited. Roots in the acid soil areas bore nodules. Here was evidence that liming was improving the results from inoculation because lime was providing calcium.

In order to separate the nutritional values of calcium for the plant from those for the bacteria, more detailed tests of the soybean and its calcium needs were undertaken. It was readily demonstrated that calcium was more important than magnesium or potassium in the early life of the soybean plant.

A deficiency supply of calcium encouraged attacks on the plants by a fungus resembling "damping off," and brought failure of inoculation.

To determine the minimum amounts of calcium required per plant for effective establishment of the stand, calcium was used in the solution form and in the form absorbed on colloidal clay. The latter method permitted variable amounts of clays at different degrees of acidity (pH). It thus permitted controlled amounts of calcium at any pH or degree of acidity desired. *These trials demonstrated that the soybean's early growth was dependent on a significant supply of calcium more than on a particular degree of soil acidity.* Nodulation could not result later unless liberal levels of calcium were provided early to carry the plant to the inoculable age. More detailed separation of the calcium as a nutritional element from its role in modifying the soil's reaction as this influences nodulation was undertaken by using acid clay neutralized to different pH values or degrees of acidity through titration with calcium hydroxide.

pH Varied

Constant amounts of calcium were provided at different pH values by taking the proper amount of clay at a particular pH. Thus by placing these different amounts of the clays of different pH values into sand for soybean growth, there were provided soils of variable pH but of constant supplies of exchangeable calcium. Plant growth and nodule production showed clearly that even though the soybeans reflected their response to differences in soil acidity, they reflected far more their growth and nodulation response to the amount of calcium provided.

Nitrogen fixation, or an increase of nitrogen in the crop over that in the planted seed, did not occur even in a neutral soil unless the supply of calcium was ample. It occurred in acid soils containing liberal supplies of exchangeable calcium. *Here, then, was distinct evidence that if inoculation of soybeans is to be effective in making this crop serve for soil improvement, the soil must deliver calcium to these plants.*

Competition

We may well imagine competition between the soil and the plant for the lime. The absorbing power of the soil for nutri-

(*Continued on page 26*)

The New Soybean Grades

● *Actual value the watchword*

By WALTER FLUMERFELT
Manager, Soybean Processing Company, Waterloo, Iowa

THE new Official Standards will be used by all grain dealers to grade 1941 crop soybeans. It will be noted that test weight per bushel and damage factors are changed only slightly. No. 2 yellow soybeans permit maximum moisture of 14 per cent instead of 15 per cent. Some tolerance is given on splits where No. 2 yellows allow 15 per cent instead of 10 per cent.

Perhaps the biggest change lies in consideration of foreign material where the element of dockage is included for the first time, and the round holes in the grading sieves are 8/64 inch instead of 10/64 inch diameter. May we here point out that many times dry soybeans have broken into particles which would pass through 10/64 inch holes and be lost in the foreign material. After many tests, it was decided that 8/64 inch holes would permit removal of dockage materials and save a considerable quantity of broken soybean particles.

We will take a sample of mine run soybeans, secured with regular grain probe, and grade them for demonstration. You will note the procedure in securing 500 gm. and 100 gm. samples through the Boerner mixer, a device with by-passes to insure average cross-section as a sample is made smaller. Then, we put our weighed sample through the new grading sieves noting that there is no change in the splits separating sieve, but that the holes in the bottom or dockage sieve are 8/64 inch instead of 10/64 inch. These smaller openings hold back a lot of broken soybeans as splits, thus saving them from loss as dockage.

Weighing Dockage

We figure dockage immediately by weighing the substance in the bottom pan. The quantity of dockage is computed in percentage, and is expressed in whole per cent. A fraction of a per cent is ignored. For example, dockage computed as 2.4 per cent would be shown as 2 per cent; likewise 3.9 per cent would be shown as 3 per cent; 0.9 per cent would be ignored.

Foreign material, which is all matter other than soybeans not separated by the dockage sieve, is removed by hand from the top and middle grading sieves and weighed. Over 2 per cent foreign material throws soybeans out of No. 2 grade, and in common practice all over 2 per cent is weight dockage, this amount being added to dockage previously determined.

Splits are weighed and percentage computed from size of sample after dockage.

Then, with the sample after removal of dockage, we determine the test weight per bushel by filling the test can and weighing—scale calibrations read this factor direct. When we consider that soybean solids weigh about 1.35 times the weight of water, you can see how important it is to the commercial user of soybeans that he know whether the 60 pound bushel of soybeans is solid substance or worthless weight.

Damaged Beans

Damaged soybeans are recognized by both external and internal condition of the kernel. Serious damage is indisputable but border line cases may be subject to individual opinion. A reasonable rule to follow is that the inside of a good soybean is yellow. Heating and weathering will darken soybeans by injurious oxidizing of the oil. Immature soybeans are green and very low in both oil and protein. Damaged soybeans up to 3 per cent are tolerated but thereafter discount must be taken for inferior grade.

It is hoped that farmers will continue the culture and development of soybeans high in both oil and protein because wide-

(*Continued on page 22*)

NEW GRADES — Effective as of September 1, 1941

Grade requirements for Yellow Soybeans, Green Soybeans, Brown Soybeans, Black Soybeans, and Mixed Soybeans

Grade No.	Minimum Test Weight per Bushel	Maximum Limits of			
		Moisture	Splits	Damaged Kernels (Soybeans and Other Grains)	Foreign Material Other Than Dockage
	Lbs.	Pct.	Pct.	Pct.	Pct.
1*	56	13	10	2	1
2*	54	14	15	3	2
3	52	16	20	5	3
4**	49	18	30	8	5

Sample Grade — Sample grade shall include soybeans of any of the classes — Yellow Soybeans, Green Soybeans, Brown Soybeans, Black Soybeans, or Mixed Soybeans — which do not come within the requirements of any of the grades from No. 1 to No. 4, inclusive; or which contain stones and/or cinders; or which are musty or sour or heating or hot; or which have any commercially objectionable foreign odor; or which are otherwise of distinctly low quality.

*The soybeans in Grade No. 1 of each of the classes Yellow Soybeans and Green Soybeans may contain not more than 2 per cent, and the soybeans in Grade No. 2 of each of these classes may contain not more than 3 per cent of Black, Brown, or bicolored soybeans, singly or combined.

**Soybeans that are badly weathered or badly stained shall not be graded higher than No. 4.

DOCKAGE — Dockage includes weed seeds, weed stems, chaff, straw, grain other than soybeans, sand, dirt, and any other foreign material, which can be removed readily from the soybeans by the use of a 20-gauge metal sieve having round-hole perforations 8/64 inch in diameter; also undeveloped, shriveled, and pieces of soybeans removed in properly separating the foreign material.

The quantity of dockage shall be calculated in terms of percentage. The percentage of dockage so calculated, when equal to 1 per cent or more, shall be stated in terms of whole per cent, and when less than 1 per cent shall not be stated. A fraction of a per cent shall be disregarded. The word "Dockage," together with the percentage thereof, shall be added to the grade designation.

SPECIAL GRADE: Weevily Soybeans. Definition. Weevily soybeans shall be soybeans that are infested with live weevils or other insects injurious to stored grain.

Grades. Weevily soybeans shall be graded and designated according to the grade requirements of the standards otherwise applicable and there shall be added to, and made a part of, the grade designation, the word "Weevily."

GRADE FACTORS: Definitions.

(a) Basis of grade determination. Each determination of moisture, dockage, temperature, odor, live weevils or other insects injurious to stored grain, shall be upon the basis of the grain as a whole. All other determinations shall be upon the basis of the grain when free from dockage.

(b) Percentages. Percentages, except in the case of moisture, shall be percentages ascertained by weight.

(c) Percentage of moisture. Percentage of moisture shall be that ascertained by the water oven and the method of use thereof described in Service and Regulatory Announcements No. 147 of the Agricultural Marketing Service of the United States Department of Agriculture, or ascertained by any device and method which give equivalent results.

(d) Test weight per bushel. Test weight per bushel shall be the weight per Winchester bushel, as determined by the testing apparatus and the method of use thereof described in Bulletin No. 1065, dated May 18, 1922, issued by the U. S. Department of Agriculture, or as determined by any device and method that give equivalent results.

(e) Splits. Splits shall be pieces of kernels of soybeans that are not damaged.

(f) Damaged Kernels. Damaged kernels shall be kernels and pieces of kernels of soybeans and other grains which are heat-damaged, sprouted, frosted, badly ground-damaged, or otherwise materially damaged.

(g) Other Grains. Other grains shall include wheat, rye, oats, corn, grain sorghums, barley, hul-less barley, flaxseed, emmer, spelts, einkorn, Polish wheat, poulard wheat, and cultivated buckwheat.

(h) Foreign Material. Foreign material shall be all matter other than soybeans which is not separated from the soybeans in the proper determination of dockage.

THE Soybean Digest

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GEO. M. STRAYER, Editor — ROBERT BLISS, Managing Editor

VOL. I · NO. 11

THIS issue of *The Soybean Digest* supersedes the annual proceedings which have heretofore brought you the texts of convention addresses. We regret that lack of space has prevented the presentation of digests of all convention speeches. More will appear in the October issue. However, we are convinced that you will agree with us that the convention has been brought to the industry in a more interesting light than ever before. We'd have to think that, or else completely lose our self esteem.

THE *Digest* blushes at all the praise which it received at the hands of convention speakers and the resolutions committee. It says that it will do its best to live up to the euconiums, and that it will try all the harder to present the news of the industry in an even more complete and interesting manner. Incidentally it says that it is going after potential advertisers all the harder because it is convinced that its pages are the best advertising value available to the soybean and related industries. *The Digest* says it won't try to read minds like the lady at the convention, but that what it did last year is nothing compared with what it is going to do this year.

FROM every source, we hear praises of the convention. This, we feel, is due to the enthusiastic support accorded by the industry, and to an unusually versatile and talented array of speakers. Des Moines was eager to have the convention, and provided us with every courtesy and consideration. The Iowa State College lent its facilities in a most generous manner. Factors such as these, and the not-to-be-forgotten hospitality of the Ford Motor Company at the 1940 convention, have contributed no little bit to the present strength and stability of the American Soybean Association.

At present, we have invitations to hold the 1942 convention in Chicago, Cleveland, Cincinnati and Memphis. We have had a particularly generous invitation from Tennessee, with officials from the governor down writing us cordial notes. The question of a convention site will be decided at a meeting of the board of directors this fall.

"FOOD will win the war and dictate the peace" says Claude R. Wickard, Secretary of Agriculture. An increasingly larger number of persons are thinking in those terms. If, as the saying goes, Napoleon's armies fought on their stomachs, then today not only armies but entire populations must be so classified. By next spring, due to the depredations of Hitler's legions, most of Europe will be hungry. War has not only upset production, but has concentrated in Germany's hands most of the supplies on hand.

Fats and oils constitute a major part of food supplies which are essential. They form the cheapest portions of a ration (usually) and the part which is first depleted in supply. They are necessary to satisfy hunger, produce body warmth and comfort.

Soybeans are entirely unique in the food world, in that they are possible major suppliers of both fats and oils and proteins. Eighteen to 20 percent of the soybean is oil. Over thirty percent is protein. Both are highly digestible, highly nutritious, and can be so processed as to become highly palatable. More palatable human food can be produced by an acre of soybeans than through any other crop. China, recognizing that, has fed her multitudes on soybeans for thousands of years. We have yet to learn their true value as human food. Soybean oil is just now finding its rightful place in the edible field. Soybean meal is still used largely as a livestock feed — and that usage must of necessity continue.

Next spring's availability of shipping space will determine the acreage of soybeans allowable next year under AAA restrictions, according to information received from prominent AAA officials in Washington. Word has already gone out that 7 million acres — 1½ million more than the 1941 acreage — will be encouraged. If shipping space seems to be available for export transport there is likelihood of further relaxation of restrictions. In time of war anything may happen. That applies to the soybean industry. It is likely that we shall find ourselves involved in a major food industry before this war is over.

PRIORITIES have already changed plans of many persons involved in the industry. New machinery for soybean processing is almost out of the question, unless used as replacement. Repairs are also difficult or impossible to obtain. Yet those persons in charge of defense priorities recognize that the domestic food machine must be kept rolling along with the war machine.

The Office of Agricultural Defense Relations has been charged with the job of keeping food supplies and food industries rolling in accord with defense production. If you are in need of repairs, replacement equipment, or new equipment you should contact that office for a priorities rating. Mr. Needler, known to some of you, is in active charge, and your request will receive immediate attention. Do not expect the impossible. Give full information on the needed equipment, the manufacturer, the capacity of your plant, the products processed, and on the necessity for the equipment desired. A straightforward request will receive a like answer.

EXTRA HELP AT LOW COST

YOURS BECAUSE OF A NEW IDEA!

• Extra help at low cost!—sounds like the good old days, but it can be yours, right now, because of a *new idea.*

That *new idea* is the Ferguson System.

It is a new way for attaching implements to a tractor and controlling them in the soil. It makes possible a light weight tractor that develops plenty of traction to pull a two-bottom plow under practically all conditions . . . and yet, saves fuel on the lighter tasks such as weeding or cultivating because it eliminates useless dead weight.

It brings you a tractor that costs less to buy and less to operate. It brings you a tractor that has such "plus" features as safety electric starter, automotive steering, finger tip implement control, minute-change for implements and automatic depth control of unit implements. It brings a tractor that anyone can operate safely and easily.

There is only one sure way to find out how the Ford Tractor with Ferguson System will bring you the extra help you need by doing your work quicker and at lower cost. That is to try it on your own farm. You can do that by calling your local dealer for a free demonstration, now.

Whether you want to use a two-bottom plow, a planter, a weeder, a cultivator, a mower, or a combine, the Ford Tractor with Ferguson System will do your work for you quicker, easier and at less cost than you can do it now. Ask your local dealer to show you why right in your own soybean field . . . or on any other crop you may have.

Ford Tractor FERGUSON SYSTEM

© Ford Motor Company

The Ford Tractor with Ferguson System is sold and distributed nationally by the Ferguson-Sherman Mfg. Corp. of Dearborn, Michigan. There is a local dealer in your neighborhood.

Ford Develops Soybean Upholstery Fiber

● *What next?*

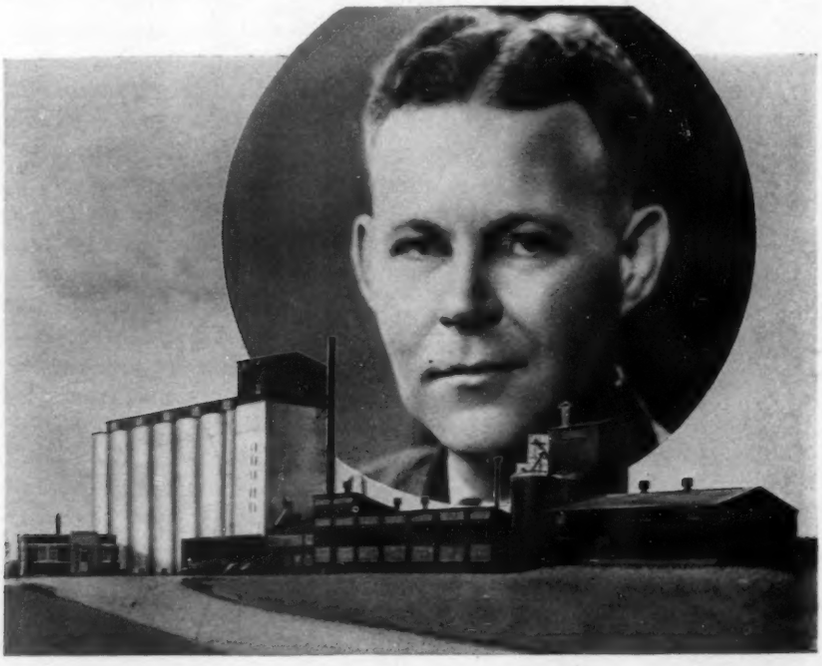
By D. R. RAMSEYER, Ford Motor Co.

WE are pleased to be here and have the opportunity of telling you about the progress of the utilization of soybeans by the Ford Motor Company. Last year, during your annual meeting at Dearborn, many of you had an opportunity to visit our laboratories and Rouge processing plant and observe, first hand, the projects working at that time.

One of the uses for soy meal, which was started in 1936 and dropped for a while, is making a removable top for casting steel ingots in our steel mill. A mixture of meal, clay, and sand is used for this hot top. This year the project was revised, carried to solution, and we are now using substantial quantities of meal in our steel mill.

There has been little change in the soybean plastic picture in the past year. We are still using the original phenolic type soybean meal plastic. The plastic automobile which is being exhibited does not contain soybeans. It is made of a cellulose fiber and synthetic resin mixture. This is in line with our policy of using farm crops, however. We will need fibers raised on the farm, such as cotton ramii, for this use.

We have made panels with good results containing soybean meal and work is underway to note the effect of sizing the fibers with soybean protein. Because of the shortage of phenol and formaldehyde in this country several companies are now investigating soybean meal as a plastic base.



Synthetic Fibers

The use of soybean oil in the Ford Motor Co. has not changed much in the last year. The project that has advanced most rapidly is the development of synthetic fibers from soybeans. These wool like fibers are made from the protein fraction of the soybeans.

There are five steps in production of the fiber:

1. **Extraction of the oil.**
2. **Extraction of the protein from the oil free meal and precipitating to purify.**
3. **Dissolving the protein to produce a viscose, stringy solution and spinning into a fiber.**
4. **After treating to set the fibers and drying.**
5. **Spinning the fibers into yarn.**

The extraction of the oil is done by the continuous solvent process in a plant developed by the Ford Motor company.

The next step is the extraction of the protein from the oil free meal. This is a very important and critical step. The meal is ground, sized and then mixed in a stainless steel mixer with the extraction solution. Great care must be exercised to produce uniform batches. One of the instruments used is a continuous pH controller which controls the alkalinity and acidity of the various extraction and precipitation solutions.

The resulting protein solution is then clarified by continuous self cleaning centrifuges. The clarified protein solution is next precipitated with an acid, washed, filtered, and dried.

Concentration Increased

The dried protein now enters the third step in the fiber processing. It is dissolved in another mixer, producing a very viscose stringy solution. An interesting point here is that originally we found that a protein concentration of over 12 per cent would cause jellying. By close control, of conditions up to this point, solutions of 20 per cent concentration for spinning are now being successfully made.

The solution is spun after dissolving and aging by pumping through a filter and then through spinnerettes into a coagulating bath where the stringy solution is coagulated into threads. The coagulated threads are then wound on a reel, at present we are using spinnerettes with 500 holes.

During this winding process the fibers are run over Godet wheels. The second wheel turns faster than the first, thereby causing a stretching of the fibers. This

(*Continued on page 18*)

"*Thanks*... AND COME AGAIN"

"We, at the Swift & Company soybean mill, Des Moines, derived many benefits from the American Soybean Convention, just concluded. Among them was the opportunity to talk with producers from this area and elsewhere. We are particularly pleased that so many visited our plant, for there is no better way to advance the mutual interests of those engaged in soybean production, or with soybean processing, than friendly discussion.

"We urge all of you, therefore, to visit our plant whenever you can. We like to hear your views, and your problems, and we believe you'll take back some interesting knowledge about our own way of doing things."

A. FRANK LEATHERS

Swift & Company

NITRAGIN INOCULATION IMPROVES YIELD AND QUALITY

In the above illustration it is easy to see that the soybeans on the left are far better than the uninoculated stand on the right. What is equally important to remember is that correct inoculation also increases the protein content and improves the quality of the crop even where there is little noticeable difference in the appearance of the crop in the field. The surest and most economical way to assure correct inoculation is to inoculate every pound of soybean seed before planting with NITRAGIN.

SOYBEAN INOCULATION TESTED IN MODERN LABORATORIES

You can't see inoculating bacteria or make a quick demonstration of their effectiveness — you must buy inoculation on faith. That's why the extensive research and testing that the Nitragin Company has carried on with inoculating bacteria is of great value to all soybean growers.

The illustrations above show the Nitragin greenhouse and a part of the laboratory where chemical tests are made to determine the protein content of soybean plants grown with various strains of inoculating bacteria.

When you plant soybeans, be sure to inoculate the seed with NITRAGIN — the best known and most widely used legume inoculant in America. Leading seed dealers sell NITRAGIN.

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NITRAGIN
THE ORIGINAL LEGUME INOCULATOR
FRESH — HIGH BACTERIA COUNT — DATED
Read Guarantee — PACKED WITH
MANY BILLION LEGUME BACTERIA
HIGHEST QUALITY AT LOWEST COST
GOOD ONLY FOR LEGUME SEEDS STATED ON TOP LABEL

Free VALUABLE LEGUME BOOKLET . . . ALSO SOYBEAN BULLETIN

Tells how to grow better soybeans, alfalfa, clovers, etc. for cash, feed, and soil building. Copies free to farmers.

YOUR PROTECTION!

The name NITRAGIN is a registered trademark put on every can. It identifies the only inoculants containing NITRAGIN'S highly effective strains of legume bacteria. Look for this trademark—it is your protection.

The Demand Is for Bland Oil

● *Let's have more yellow beans, says*

LAMAR KISHLAR
Research Director, Ralston-Purina Co.

IF that salty old sea captain who in 1804 brought the first soybeans to America could return, as did Rip Van Winkle, he would be astonished at the result of his importation. Instead of a botanical curiosity for his garden, he introduced an amazing plant rivaling Jack's Bean Stalk in the galleys of print which have been written about it.

Because the soybean is so copygenic, much fiction as well as fact has crept into the success stories which have been written about it. Therefore, let us turn to hard cold facts to study, "Soybean Oil—Its Current Consumption and Usage." Let us trace where it comes from, where it is processed and how it is consumed.

Soy Acreage Up

The United States Department of Agriculture crop reporting board reported on August 1, that from all indications, 5,112,000 acres of soybeans will be harvested for beans this year in the eight principal producing states of Ohio, Indiana, Illinois, Michigan, Iowa, Missouri, North Carolina, and Mississippi. This is an increase of 12 per cent over the 4,565,000 acres harvested for beans in these states last year.

On the basis of the crop reporting board's estimated acreage to be harvested for beans, and the yields indicated by August 1 conditions, the prospective production in the United States this year is about 109 million bushels as compared with 79,837,000 for 1940 and 91,272,000 bushels in 1939.

Almost 90 per cent of all soybeans harvested for beans in the United States last year came from the four states of Illinois, Indiana, Iowa, and Ohio.

It has been forecast that this harvested acreage would be 60 per cent of the total acres of soybeans grown for all purposes in these states, well above the 51 per cent of the total acreage harvested for beans last year. Because of high current prices for beans during this harvesting season, it is possible that a much larger percentage of soybeans will be cut for seed this year than the usual 50 per cent. This would increase the total yield, but will probably not materially change the relative proportions between states.

The estimated consumption of cottonseed oil during the 1941-42 season is placed at 3,798,000 barrels, while the production figures are estimated at 2,800,000 barrels. The short cotton crop this year is responsible for this disparity between production and consumption estimates.

Filling Breach

Soybean oil will to a great extent supply the deficiency of cottonseed oil. It is estimated that at least 750,000 more barrels of soybean oil will be consumed this year than were used a year ago. It will require 33 million bushels of soybeans to produce 750,000 barrels of soybean oil. The increase in soybeans from the 79,837,000 bushels of last year and the estimated 109,000,000 bushels this year is only 29,000,000 bushels.

If the entire difference of 990,000 barrels between estimated cottonseed oil consumption and cottonseed oil production are replaced with soybean oil, it would require 44 million bushels more of beans this year.

At present, there is a spread of over 1½ cents between the price of crude soybean oil and crude cottonseed oil. This is the greatest spread in over 10 years. Since most refiners can and do use soybean oil at a spread of only ¼ cent under crude cottonseed oil, there now is a tremendous price advantage in favor of cottonseed oil replacement with soybean oil.

Thus, a large replacement of cottonseed oil with soybean oil this coming season is indicated, although the full effect of this influence may not be felt until the marketing of the new soybean and cottonseed crops are

(Continued on page 16)

New 50 Bu. Size
SOYBEAN INOCULANT
Containing Ten Inner 5 Bushel Size Cartons
Leads the Field!

● **TOP QUALITY — LOW BULK PRICES**
Widely recognized as *second to none* in efficiency. Thousands of well satisfied users. Sold at LOW BULK PRICES. Ask your Dealer.

● **EXCLUSIVE FEATURES — Easier to Use**
Packed in Pliofilm for your protection
Has many exclusive features that appeal strongly to Soybean Growers. No more guesswork or measuring. Once you use this inoculant you'll choose it again and again because it saves time and energy on busy planting days.

● **ACCEPT NO SUBSTITUTE**
When you buy Soybean inoculant again . . . demand LEGUME-AID or McQUEEN'S. Find out for yourself why so many other Soybean Growers use these quality inoculants with complete satisfaction.

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PRODUCED, TESTED AND GUARANTEED BY
AGRICULTURAL LABORATORIES, INC.
GENERAL OFFICES, COLUMBUS, OHIO, U. S. A.

WAYNE

"I WANT MORE EGGS, POULTRY, PORK AND DAIRY PRODUCTS FOR NATIONAL DEFENSE"

Through the U.S.D.A. Uncle Sam is asking for increased production to help win the "Battle of Food".

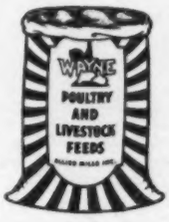
WAYNE REPLIES: "Animals and birds fed Wayne "I-Q" Feeds have an opportunity to produce in line with the breeding back of them. Laying hens have produced 50% more eggs on the "I-Q" Program. Broilers showed a 25% greater growth when given "I-Q" feed as compared to those on the same formula made from untested ingredients. Turkeys have produced 25% more meat in the same time when given the advantages of "I-Q". Hogs on tested ingredients have in the same time produced an average of 50 lbs. more per hog when given tested versus untested ingredients. Help yourself and Uncle Sam — *FEED WAYNE.*"

Four Soybean Processing Plants

Allied Mills was a pioneer in soybean processing and led the way in soybean research and popularizing the use of Soybean Meal for livestock and poultry feeding.

Our four big processing plants are located at:

Peoria, Illinois; Omaha, Nebraska; Portsmouth, Virginia and Taylorville, Illinois



FOR YOUR OWN PROTECTION

— use WAYNE FEEDS that have the I. Q. Seal of Quality stamped on the Bag. When you use WAYNE you help make a better market for your soybeans.

ALLIED MILLS, Inc.

EXECUTIVE OFFICES: Chicago, Ill. SERVICE DEPARTMENT: Ft. Wayne, Ind. FEED MILLS: Peoria, Ill.; Fort Wayne, Ind.; East St. Louis, Ill.; Omaha, Neb.; Buffalo, N. Y.; Portsmouth, Va.; Memphis, Tenn.

WAYNE

Farmers Resent Market Fluctuations

By MAX BELZ
Holland Grain Co., Holland, Iowa

IT will soon be soybean time again in Iowa. Shortly we'll see the combines bump out and crunch into the browned beanfields. A good proportion of the crop now in the fields will doubtless be brought to market direct from the machines, because prices are exceptionally good.

The *price* problem, as we see it in the country grain trade, is the biggest puzzler facing the farmer as he lays his planting plans each spring.

Other deterrents to more general production of soybeans as a cash crop should be mentioned, of course. The difficulty of raising beans on rolling ground is one. The still prevalent notion that beans are hard on soil is another. Thirdly, a lack of ready marketing places has slowed acceptance of this important farm product in many sections.

But the old refrain that the farmers sing today concerning beans is not so much "What Will the Harvest Be?" as it is "Oh, What Will the Markets Be?" And well it is that they might sing that song, for we know that many of them sold their crop last summer at sixty cents, only to watch the market climb dizzily to a *dollar* and sixty cents. The low price discouraged bean planting, and the extremely high price is referred to by the average farmer as "out of line" and "unreasonable."

The wild soybean markets have many producers feeling somewhat like an asthmatic old sales manager in Mason City feels about baseball. He told a group of salesmen all about it one rainy afternoon.

"I have ben a great lover of baseball," he said. "At one time I visited Chicago during the playing of a world series. I had always admired Ty Cobb, and he was playing in the series.

"Before going to the game, I went to a nearby cigar store and purchased a FIFTY CENT CIGAR. I enjoyed the game immensely, for Ty was in his top form.

"On my way out of the stadium, I stopped at the dressing rooms. Approaching Ty with the FIFTY CENT CIGAR, I sed, 'Tyrus, accept this cigar as a token of my esteem . . . as a gift from a great lover of baseball.'

"Ty took that cigar, and placed it beneath his nose, and sed, 'I never smoke ANYTHING but SEVENTY-FIVE CENT CIGARS.'

"Fellas," said the asthmatic old man, as he turned intently toward the sales group, "I hev never loved that fool game sence."

Lots of farmers have never loved the soybean game since they got so badly fooled on the markets last year.

This price bogey should gradually fade away, of course, as producers, handlers and processors of the commercial beans acclimate themselves to new conditions. Establishment of the soybean futures market in Chicago has been a great forward step. Any move toward a safer and saner soybean market will be welcomed by all of us, because increased stability of price will result in increased stability of production.

"Produce Bland Oil"

(Continued from page 14)

well under way.

Since Illinois produces about 52 per cent of the soybeans harvested for seed, it is, of course, expected that central Illinois should do the bulk of the crushing.

The total available crushing capacities in the 50 most important crushing centers is 82 million bushels. There are seasons when some of this capacity may be used for cottonseed, linseed, or other oil bearing materials. Because actual production figures are usually confidential, we cannot tell the exact bushels crushed in each city, and we are unable to estimate the capacity lost because of shut downs for repairs. At the same time this figure indicates what might be done if all crushing plants could be operated at capacity.

The 82 million bushel figure does not include the capacity of a number of small hydraulic crushing plants normally operating on cottonseed which might be operated on soybeans if the crushing operations were profitable.

Oil For Food

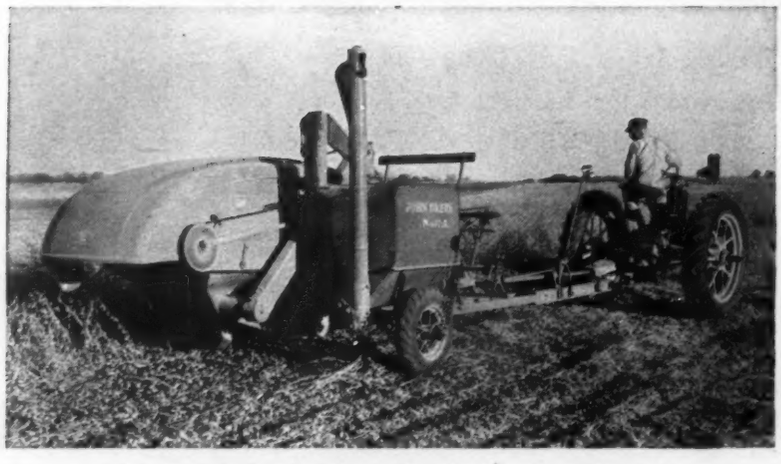
More than 82.5 per cent of all soybean oil produced in the United States is consumed in edible products. Shortening takes 52 per cent, margarine uses 21 per cent, and other edible products such as salad oils consume nearly 10 per cent.

Paint uses a mere 7.25 per cent of the soy oil made. Soap finds use for 4.25 per cent largely in paste soaps for technical uses. Linoleum and oil cloths account for 1.8 per cent. Small miscellaneous uses including printing inks and foundry core oils total slightly over 4 per cent.

(Continued on page 17)

Savings add up in a hurry

When you harvest Soy Beans with a



JOHN DEERE COMBINE

● Savings in soy beans and in harvest costs soon add up into important money with a John Deere Straight-Through Family-Sized Combine on the job. You can be sure of more bushels of higher grading beans in the bins — at a lower per-bushel harvesting cost.

Crop savings in John Deere Combines start at the cutter bar and follow *straight through* the machine. John Deere Combines practically shave the ground to save the low-growing pods. Their gentle handling of the crop from cutter bar to cylinder . . . their clean threshing with a minimum of cracking . . . their thorough separation and careful cleaning, together with exceptionally low operating costs, insure bigger soy bean growing profits.

● Write today to John Deere, Moline, Illinois, for free folders on these remarkable, time-, work- and money-saving combines.

JOHN DEERE • MOLINE, ILLINOIS

Four out of every five gallons go into food where light colored oil of bland flavor is demanded. Isn't this reason enough why we growers and crushers should give more attention to the yellow variety of beans which give light colored bland oil?

Every pound of soybean oil must find a place for itself in competition with older and better known oils. Every tank of soybean oil must replace a tank of cottonseed oil, linseed oil, corn oil, or a score of others.

Soybean oil was 17.8 per cent of the ingredients which went into shortening in 1940. While cottonseed oil with 68.8 per cent is still used in more than three times the quantity of soybean oil in shortening, the gain which has been made by soybean oil in the last few years is remarkable.

In margarines, soybean oil composed 34 per cent as compared with cottonseed oil's 45.3 per cent. Coconut oil with 8.5 per cent, oleo oil 5.6 per cent and babassu 2.4 per cent were small competitors. Much of the increased use of soybean oil in margarine was at the expense of imported coconut oil.

In other edible products such as salad oils, soybean oil constituted 8.3 per cent compared with cottonseed oil 54.8 per cent, corn oil 14.8 per cent, coconut oil 11.4 per cent.

Soybean oil in paint is still a small competitor, making up only 6.8 per cent compared with linseed oil 62.2 per cent, tung oil 12.6 per cent, fish oils 7.1 per cent. Some of the newer developments such as fractional distillation and special treatments to improve the drying quality of soybean oil will increase this use somewhat but even if soybean oil should replace all linseed oil in paints and varnishes it would equal approximately half the quantity of soybean oil going into edible uses.

Linseed oil is still the basic oil for linoleum and oil cloth with 75.4 per cent. Fish oil, partly because of its low cost, made up 13.4 per cent. Soybean oil composed 6.5 per cent of linoleum and exceeded perilla and tung oils combined.

This is a picture of North America's second largest vegetable oil. It shows clearly that our largest customer is food. Let us then produce the kinds of beans to be crushed in the way which produces light, clear oil of bland sweet flavor to capture a larger portion of this huge domestic market which is beckoning to us.

New

Items for the Table

SOY PRODUCTS BY MILLER

SOY-A-MALT

A delicious wholesome soy-malted milk — a pure vegetable beverage containing all and more of the food qualities of milk.

CANNED GREEN SOYBEANS

Delicious creamed, buttered, or in soups and salads.

SOYALAC

Spray-dried Infant Food — the perfect formula for the new-born infant — especially fine for malnutrition and allergic conditions.

Available in Health Food Stores everywhere or for further particulars regarding these Miller Soya Foods write

INTERNATIONAL NUTRITION LABORATORY

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A. D. M. Soybean Processing Plant . . Located at Decatur, Illinois.

Other Soybean Processing Plants Strategically Located at:

CHICAGO
TOLEDO
MILWAUKEE
MINNEAPOLIS
BUFFALO

WHAT IS GOOD-WILL?

Good-Will is the disposition of a satisfied customer to return to the place where he has been well treated.

The Archer and Daniels families have been engaged in the Oil Milling business for a century (1840-1940), and the good-will which has been built up during those hundred years is jealously guarded in every transaction.

The Mark of

ARCHER BRAND

Quality Soybean Products

ARCHER-DANIELS-MIDLAND COMPANY

MINNEAPOLIS, MINN.

It is always satisfying to do business with Kellogg. The quality of Kellogg's Soybean Oil Meal and Kellogg's Linseed Meal is beyond question. Kellogg Mills and sales offices are so located as to render you the best service possible. Kellogg's resources are ample to support this policy.

SPENCER KELLOGG AND SONS, INC.

Sales Offices: Buffalo, Chicago, Decatur, Ill., Des Moines, Minneapolis, Los Angeles

Mills: Buffalo, Chicago, Decatur, Ill., Des Moines, Minneapolis, Edgewater, N. J., Los Angeles.

"Keep Ahead With Kellogg"

Soy Fiber by Ford

(*Continued from page 12*)

is an important operation, as the stretching orients the molecules and produces a strong pliable fiber. X-ray studies have emphasized the importance of this stretching. In order to obtain the control necessary in the spinning operations it was necessary for us to design and build our own machine.

The stretched fiber is then given a formaldehyde treatment to set the fiber, cut into staple lengths and dried under closely controlled conditions. The conditioned fibers are processed on conventional fiber spinning equipment. The fiber is put through a picker and blender and then through a carding machine. The carded fiber is then run through a warping machine to give it its primary twisting and to blend in other fibers such as wool, rayon, and silk. The warped fiber goes to the final spinning frame. A loom is now on order to make finished upholstery cloth.

Close control is kept on the quality of the finished fiber. During the past year we have been able to increase the strength of the soybean fiber 10 per cent. At present the fiber has a greater elongation than wool, and about 80 per cent of the tensile strength of wool. An air conditioned room with strict humidity control is necessary for proper testing.

Blended Cloth

Successful blends using 40 per cent soy and 60 per cent cotton have been made. We have suiting material using 30 per cent soy fiber. Tests on upholstery containing 30 per cent soy fiber are very promising. At present we are installing equipment to produce 1,000 pounds per day and process it into finished cloth. Felt manufacturers are very much interested in this development. A 50 per cent blend of soybean fiber has proven to be equal to the felt now available for hats.

Pressure is being exerted on the concerns interested in soy protein to increase the production of this material to replace milk casein which was being imported. This soy protein would be especially useful in glues and plywood manufacture.

Because of the uncertain conditions existing at present we are being urged to increase the use of domestic crops in industry and our laboratory feels sure soybeans will play an important part in relieving shortages of materials now appearing. A good example is the oil which in many uses was simply a cheaper diluent and now has developed into the important ingredient.

INCREASE YOUR FARM PROFITS

» Feed SOYBEAN OILMEAL by preference, thus making a better market for your cash soybeans. We now guarantee 43% PROTEIN in our CEDAR VALLEY BRAND Old Process Soybean Oilmeal. Try it — our prices are always in line. We give good service on both carlots and trucklots.

SOY BEAN PROCESSING COMPANY

WATERLOO, IOWA

A Huge Increase

The rapid increase in the use of NOD-O-GEN for soybeans is shown by this graph

Yes . . . the use of NOD-O-GEN for soybeans since 1937 has increased far more rapidly than the number of acres planted to soybeans. NOD-O-GEN was a big seller in 1937, but its use since then has more than doubled. This is due to several causes.

Inoculation Pays

More and more growers have become convinced that the use of a good inoculator . . . on soybean seed just before every planting . . . pays big returns.

Nod-O-Gen's Good Record

Among growers, county agents, state colleges and the U. S. D. A., NOD-O-GEN has a good record of honest performance.

Graduate Bacteriologist

NOD-O-GEN has been produced under the supervision of a graduate bacteriologist for over 25 years, a longer continuous period than any other commercial inoculator.

Nod-O-Gen Is Pre-Tested

Before being released for use, every lot of NOD-O-GEN is pre-tested in laboratory and green house to make sure of the presence of billions of vigorous bacteria of the right kind.

Constant Research

To keep the quality of NOD-O-GEN at the highest possible peak, the NOD-O-GEN laboratories carry on a constant program of research. As soon as methods are found to make NOD-O-GEN an even better product for the grower, these methods are put to use.

Write for Booklet

Write for a 20 page booklet, "Better Crops with the Pre-Tested Inoculator," a plain language discussion of what State Experiment Stations and the United States Department of Agriculture have discovered about inoculating legumes.

Inoculator Division

THE ALBERT DICKINSON CO.

Chicago, Ill. Est. 1854

NOD-O-GEN The Pre-tested Inoculator — **America's Largest Selling Complete Inoculator Line**

Equipment Industry Eyes Soybean

By E. W. HAMILTON, Research Division, Allis-Chalmers Co.

WHEN a new field crop is introduced to American farms the first question which the farm equipment industry must answer is "Will the machinery now available handle it, or is the tilling and field processing of such a nature that new equipment must be designed to do the job?"

The soybean has thus far found its home largely in the Corn Belt and insofar as tilling machinery is concerned corn equipment has been made to serve. Special equipment for handling soybeans alone has been scarcely practical as yet. Thousands of farmers do not raise more than 15 or 20 acres of soybeans per year and such acreages will not bear much of an overload of extra equipment.

If soybean acreage continues to increase in the next ten years as it has in the past it is possible that some new soybean tillage tools may be developed. There are no straws at present to indicate anything revolutionary.

A Better Bed

Soybean seed bed preparation is very much like that for corn. If anything, the soybean requires even a better seed bed than does corn.

There is really no such thing as a soybean plow but there are plows which are best adapted to particular soils for soybean seed bed preparation.

The proper planting of soybeans is a matter about which there is still room for argument. The row crop method, using either a corn or bean planter, appears to be gaining ground and the farm equipment industry is overlooking nothing which will make their regular corn and bean planters better soybean machines. The differences in kernel sizes in different varieties of soybeans calls for different sizes of planter plates and these are now available at small cost. Fertilizer attachments are available in all modern planters thus making it possible to supply any or all the elements in which a particular soil is deficient.

Row Widths

The matter of soybean row widths is a thing which calls for attention. Some want 16 inch rows, others desire 18 inch rows and still others demand 20 inch or 21 inch rows. Again we find many using 42 inch or 40 inch rows. It does not require a great stretch of the imagination to see that all of these various row widths make the designing of a single implement which will effectively handle them all a rather complicated affair, and complications always lower efficiency and at the same time increase equipment cost.

Fewer and more standardized row widths would simplify the problem for planters, cultivators and tractors and will tend to keep down first costs as well as improve efficiency. Isn't it possible to arrive at, say, standard soybean row widths, 42 inch and 21 inch? Perhaps this Association might do something along this line that would tend to clear the matter up.

Sowing soybeans with a regular grain drill is a common practice with many growers, but the matter of weed control makes this method hazardous in many fields.

Much has been done by the farm equipment industry towards adapting its regular corn cultivators to soybean requirements. The tractor mounted cultivator permits almost any reasonable row width and tractor treads can be changed to meet practically any row requirement.

When it comes to sweeps and shovels there is one to meet any soil or weed requirement. The only thing the farmer needs to know is what style is best for the job. The various uses of different designs of sweeps and shovels are a study in themselves — a study which will well reward the time and effort of any soybean grower who pursues it.

The drag harrow is a tool which has a distinct place in the soybean growers' tool kit. Under certain conditions it is a most excellent pulverizer and weed killer. One of the oldest farm tools, it has, with many improvements, held its own. The disc and spring tooth harrows each have their place, but again the farmer must always know the tillage requirements of his particular soil in order to obtain the best results.

The cultipacker must not be overlooked as a tool for seed bed preparation but soil conditions should be right for most effective use.

The Rotary Hoe

The soybean has done much to bring the somewhat despised rotary hoe back into popularity. This tool originated in the horse days but its design and construction was such that the horse could not give it the proper ground speed for really efficient work. The tractor with its high constant speeds overcame this difficulty. As a weed destroyer and a crust breaker and mulcher, under proper conditions, it does a grand job. It is possible that some impending modifications of this tool by the farm equipment industry may still further increase its efficiency.

The combine has pretty well solved the harvesting problems of the soybean grain crop. When the crop had to be harvested by the thresher method the cost was high and the hazard of curing the beans in the cock or windrow was great. A rain in the fall which would wet the beans in the cock delayed threshing as much as a week and every week the difficulty of getting them dried out was increased. The combine as we know it today — small width cut, light weight, and mounted on rubber — can be used to harvest beans under almost any conditions. Here is another case where a general farm machine was adapted to the soybean crop with but few if any changes. The rubber tipped threshing bars proved to be something which the tender soybean wanted.

Difficult Problems

When it comes to using soybeans as a forage crop some rather difficult problems present themselves. The tendency towards heating when placed in a stack makes the preservation of good soybean hay rather difficult. When cocked and left in the field until ready to feed the losses are great and the quality of the feed is impaired.

Soybeans in the green state make excellent ensilage either alone or mixed with corn, sudan grass or grain sorghums. Their rank growth however, makes handling a heavy job. They can be mowed, raked and loaded with a green crop loader but it is a very laborious task to get them from the load into the cutter.

Forage Harvester

A new piece of equipment has just come on the market in the shape of a forage harvester. This is a small efficient tool which sells under $400.00 and which mows the crop, cuts it into suitable length for ensiling and places it into the wagon to be drawn to the silo. As much as 50 green tons can thus be handled in a day. I saw two of these machines handle 650 tons of soybeans and sudan grass last fall at Fond du Lac, Wisconsin, in a crop which yielded better than 11 green tons to the acre. The crop was so heavy that a power binder could not handle it. This same forage harvester makes an excellent tool with which to follow the combine and cut up and scatter the soybean windrows so that they may be readily plowed under.

The soybean like every other American

(*Continued on page 22*)

ELEVATOR MEN!

The new federal standards render present soybean grading sets useless. Due to the present level of soybean prices, processors are more careful of grades than ever before. Don't get caught flat-footed! BE PREPARED with a

NEW SIEVE SET

Take Advantage of This Offer . . .

- **1 8/64" ROUND HOLE SIEVE**
- **1 10/64"x¾" SLOTTED SIEVE**
- **1 CATCH PAN**
- **1 YEAR SUBSCRIPTION TO—**

THE DIGEST

all for $5.75

(Regular Value, $7.25)

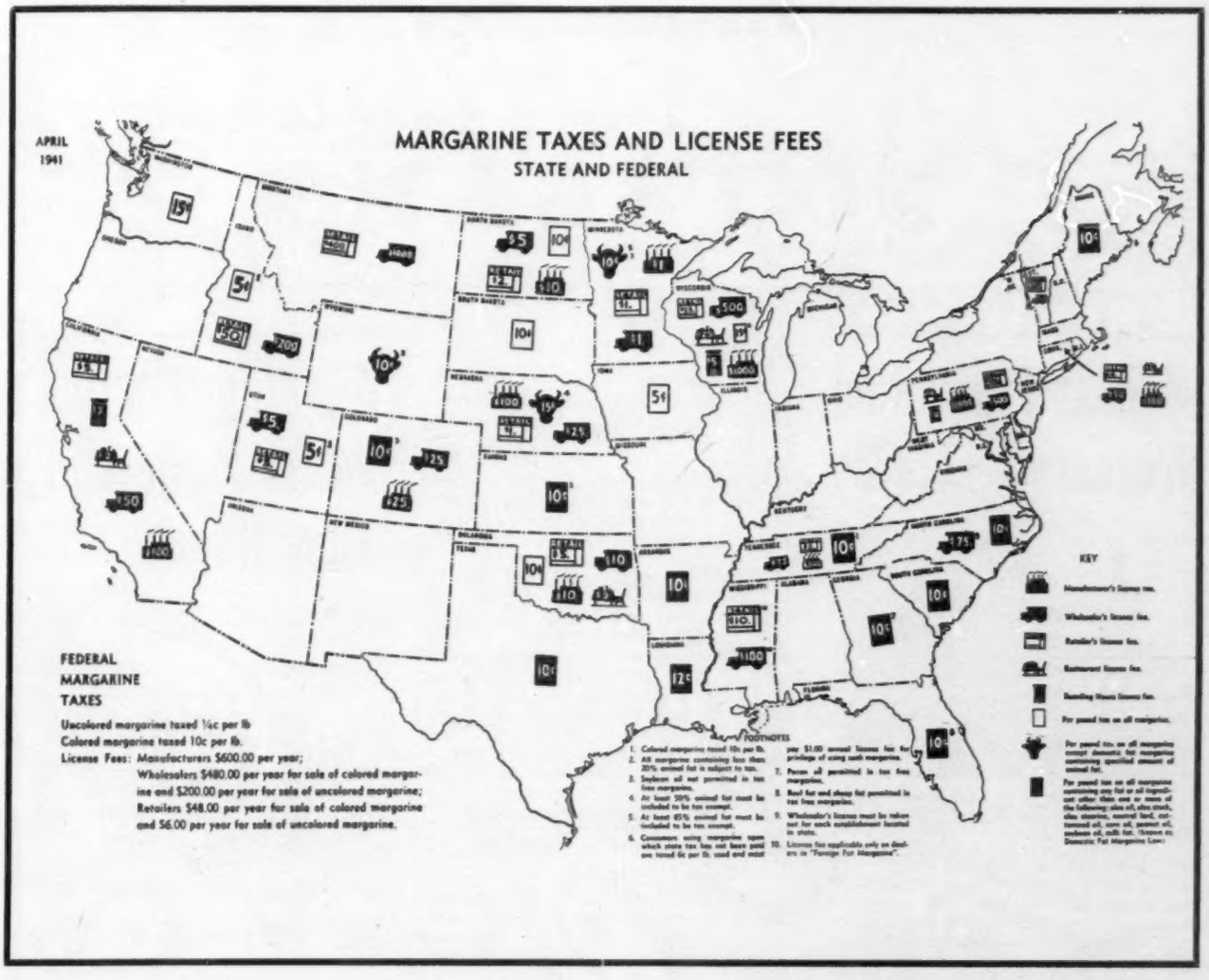
Sieves meet the new Federal grading specifications

Mail your order today to THE

Soybean Digest

Hudson, Iowa

A False Note in American Harmony


APRIL 1941
MARGARINE TAXES AND LICENSE FEES
STATE AND FEDERAL
FEDERAL MARGARINE TAXES
Uncolored margarine taxed ¼c per lb
Colored margarine taxed 10c per lb.
License Fees: Manufacturers $600.00 per year;
Wholesalers $480.00 per year for sale of colored margarine and $200.00 per year for sale of uncolored margarine;
Retailers $48.00 per year for sale of colored margarine and $6.00 per year for sale of uncolored margarine.
FOOTNOTES
KEY

Soybean Oil Oleomargarine is a fine wholesome food product. This claim is supported by findings of unimpeachable authorities.

America is rich in Consumers, but only a very few of these consumers are rich, or even well-to-do. Millions of families try to make ends meet on an income of $9.00 a week. One half of all American families have an income of less than $22.00 a week. It is in this income strata of our population that Soybean Oil Oleomargarine finds its greatest market. American Agriculture and Industry must produce and make low cost wholesome food available to this large segment of our people.

It is imperatively essential to our national welfare that this market be served. Neither Agriculture nor Industry should be unnecessarily restricted in serving that market, nor should any be denied equal opportunity in rendering that essential service.

The laws above pictured, not only unfairly obstruct that service, but destroy that equality of opportunity in the market place, which is the very back bone of our National economy and the birthright of both Agriculture and Industry.

Such laws ought to be repealed.

NATIONAL MARGARINE INSTITUTE

OLD COLONY BUILDING • CHICAGO, ILLINOIS

O. M. SCOTT & SONS CO.

MARYSVILLE, OHIO

▼ ▼ ▼

SOYBEANS

Soybean Production Increased 57.5%

with ROCK PHOSPHATE

Sam Ackerman of Tazewell Co., Illinois (shown above in the midst of his Soybean crop) made this test with 1000 pounds of Rock Phosphate per acre. After applying the phosphate to one section, the entire field was drilled to soybeans. Production on the phosphated portion of the field was 57.5% more (weight of the whole plant) than on the part not phosphated. That's not all! There were 62% more soybeans in the pods of the plants from the phosphated land! This is typical of the results obtained from applying . . .

RUHM'S PHOSPHATE

This high-grade, finely ground, natural rock phosphate offers the most effective means of supplying the phosphorous which soybeans must have, to replace the great quantities of this vital element removed from the soil with each crop. It is the cheapest and the longest-lasting source of phosphorous. If you want to get bigger, better quality, earlier-maturing soybean crops write for full details and prices.

"FARMER" RUSK
Bloomington, Illinois
or
RUHM PHOSPHATE & CHEMICAL CO.
Mt. Pleasant, Tennessee

Equipment Industry . . .

(Continued from page 20)

farm crop is rapidly being mechanized. Without the tractor it is doubtful whether the soybean crop would have increased at anywhere near the rate it did. Soybean tillage calls for thorough work when the weather is hot and the combine is necessarily a tractor operated piece of equipment.

It is useless to try to specifically predict what the farm equipment industry will do for the soybean. Suffice it to say that every branch of the industry is keeping its ear to the ground in order that it may catch every trend in soybean production. If new tools are needed and demanded the industry will be only too eager and ready to supply them. Present tillage and harvesting tools will also be kept well advanced along the path of improvement with the needs of the soybean grower constantly in mind.

—sbd—

New Soybean Grades

(Continued from page 9)

spread growth of low-oil and low-protein soybeans for cash grain might prove costly from standpoint of additional grading factors not now considered under Official Standards. After all, the intrinsic value of the soybean lies in its fat and protein content.

With commercial cash soybeans at all time high prices — 2 cents to 3 cents per pound — it is likely that grading by all consumers will become more and more exacting, so it is our hope that these remarks may encourage delivery of the highest possible grade of soybeans thus guaranteeing highest return from soybeans both as seed for next year's crop as well as for cash grain.

—sbd—

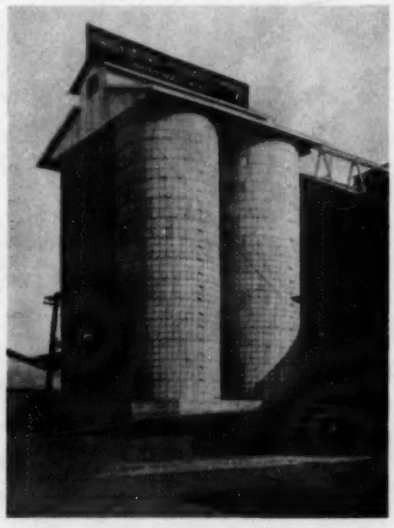
Competing with the twenty-first annual convention of the American Soybean Association was a hearing called in Washington, D. C., for September 12 by the Food and Drug Administration "for the purpose of considering soybean flours."

The federal government recently has been coming aware of the potentialities of flour in which soybean flour is a constituent. During August, the Department of Agriculture purchased 3,000,000 pounds of soybean flour. As no announcement was made regarding its distribution through FSCC channels, it is presumed that much or all of it has been shipped to Great Britain under the lease-lend Act.

A Storage Bin That's Tailor-Made To Fit Your Needs

● Neff & Fry super-stave storage bins can be built in any size for any soybean or grain handling requirement . . . as small as 10′ x 20′ or as large as 30′ x 70′. The same special N & F feature is used in every bin . . . the hi-strength, N & F diagonal locking stave that joins with six other staves and is securely bound in place by steel hoops. Often erected in three days or less. Surprisingly low cost.

Write for full details.



The Neff & Fry Company
CAMDEN, OHIO

SATISFYING YOUR CURIOSITY

"The Staley customer never guesses — he knows!"

What does that mean?

It means that a standard guarantee is not good enough for Staley's Soybean Oil Meal . . . the customer must have the whole answer before he receives shipment.

Here is what happens: A car of Soybean Oil Meal is loaded and while the loading is in progress, an inspector takes samples of the feed as it passes into the car.

The samples are then sent to our chemical laboratory and the car is held on the track until the chemist has completed his report.

When the car is finally released, a certificate is forwarded to the dealer, showing the actual protein analysis of the particular car shipped to him.

Thus when YOU buy Staley's Soybean Oil Meal from YOUR dealer, he can tell you the actual (not simply the guaranteed) analysis of the particular sack you are getting for YOUR livestock.

It's a smart way to buy.

DECATUR, ILLINOIS

PAINESVILLE, OHIO

A. E. STANLEY MFG. COMPANY

FEED DIVISION

It's In the Bag to Stay When It's In a BURROS Bag

Repeat orders often are won at the first glimpse of the delivered product — by a bag that gets the order to its destination in the same fine condition in which it left your plant. Even an old business friendship won't stand many shipments that arrive in torn and dirty bags, no matter how high the quality of the contents.

BURROS bags, known and used the world over, can help you solve your bag problem, whether you be a soybean processor or a seedsman, and can do it at a price that will save you money. Before you make your next season's contracts, let us quote you prices on reconditioned bags.

THE BURROS 5-CHECK PLAN on reconditioned BAGS

- √ 1. QUALITY
- √ 2. FULL COUNT
- √ 3. SERVICE
- √ 4. COOPERATION
- √ 5. PRICE

"IT'S IN THE BAG" BURROS BAGS Used the World Over

BURROS BAG COMPANY, INC.

Plymouth, Adams & John Sts., Brooklyn, N. Y.

MARKET SUMMARY

Chicago Futures	September 15	Week Ago	Month Ago
SOYBEANS			
October	$1.85	$1.79¼	$1.45¾
December	1.85	1.80⅝	1.46⅞
May	1.90	1.84⅝	1.50½
SOYBEAN OIL			
Tanks, Midwest Mills	10¾-11c	11¼c	9½c (old) 9⅛c (new)
SOYBEAN OIL MEAL			
Memphis, Tenn., Futures			
October	$39.25 @ 40.25	$39.00 @ 40.00	$31.00 @ 31.50
December	38.00 @ 38.25	38.00 @ 38.50	31.10
May	38.00 @ 38.30	38.50	31.05

Soybeans hit the all-time high of their 5-year history on the Chicago board of trade this month. The record was set September 12 when May futures momentarily hit $2.02. Thereupon a steady decline set in which had not been arrested at this writing. A 20 cent drop in four trading days was ample proof that the gain had been speculative. Nevertheless U. S. D. A. reports that the crush of cottonseed oil this year will be insufficient to meet consumption requirements makes the soybean position basically strong.

The cash top was $1.94 in Chicago on September 9 and 11, but very few beans changed hands on the central market. Some processors refused to buy beans at their plants during the flurry.

Soybean oil and oilmeal followed the gain in soybeans, with the former registering gains up to 2 cents per pound and the latter up to $10 per ton. They, too, were easing off from their highest points. High marketability was indicated for both products, which are cheaper respectively than cottonseed oil and cottonseed meal.

This month's extreme strength in the soybean market was touched off by Secretary Wickard's request for 7,000,000 acres of soybeans next year. Latest U. S. D. A. estimates placed the 1941 bean crop at 102 million bushels.

WE ARE NOT MAGICIANS . . .

BUT — we have done "wonders" with the Soybean. The Glidden Company's main purpose in this industry is to develop as many different products from the soybean as is commercially possible. If your industry is among the following, we have a product for you:

Feeds	Canned Foods	Adhesives
Fertilizer	Margarine	Core Oil
Shortening	Salad Oil	Lacquers
Paints	Sausage	Paper Manufacturing
Confectionery	Baking	Pharmaceuticals

THE GLIDDEN COMPANY

SOYA PRODUCTS DIVISION

5165 West Moffat Street • Chicago, Illinois

National Headquarters — Cleveland, Ohio

ORIGINATORS OF UNUSUAL PRODUCTS FROM THE SOYBEAN

More Beans in the Bag! When You Harvest with a McCormick-Deering

● From field to tank in one operation! And your soybeans harvested clean, with a minimum of cracking or shattering. That's the story when you use a McCormick-Deering Combine.

This fall, the *brand-new 6-foot No. 62* and the *4-foot No. 42* are ready to help make short work of the soybean harvest. Built for the average-size farm, the No. 62 has 20 percent more capacity than other 6-foot combines, which makes it right at home on larger acreages. The No. 42 streamlines the harvest on small farms. It is built for power-drive operation behind a tractor like the Farmall-A or Farmall-B.

Ask the nearest International Harvester dealer or Company branch for detailed information about these two combines.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago, Illinois

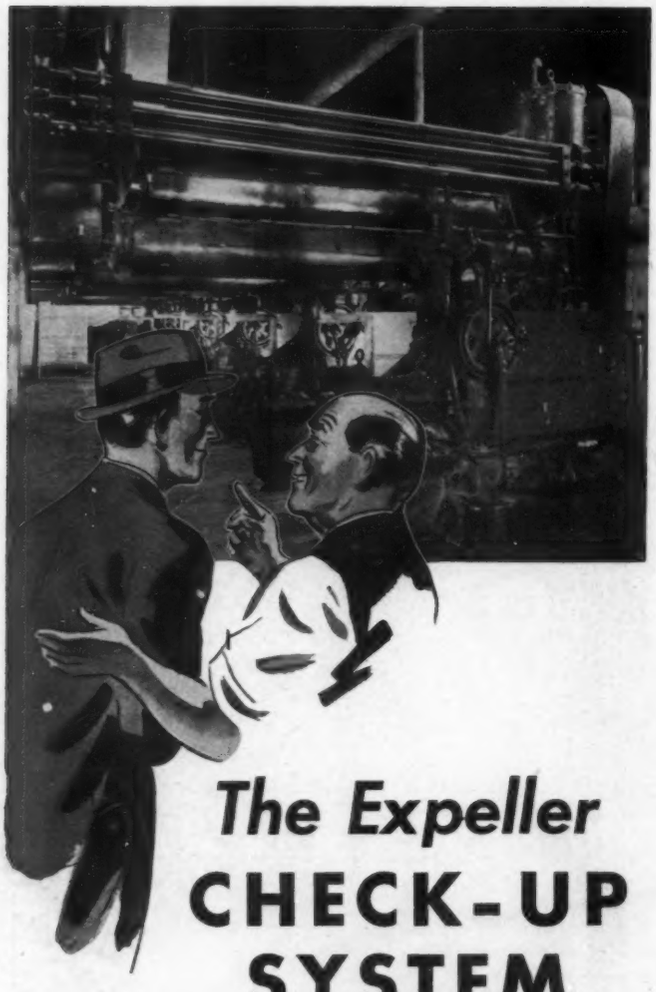
McCormick-Deering 4-ft. No. 42 — for Clean Work in Soybeans

The compact little No. 42 is easy to handle in small or irregularly shaped fields. Viney, tangled stems are no problem. Capacity: 8 to 15 acres a day. Pick-up attachment available as special equipment for gathering crops that have been windrowed and allowed to cure before threshing.

The No. 62 and No. 42 Thresh ALL These Crops—and More—Easily, Efficiently

Alfalfa
Barley
Beans (navy, lima, kidney, pinto, etc.)
Buckwheat
Carrots
Clovers (all kinds)
Crotolaria
Emmer
Flax
Grain Sorghums (feterita, milo, hegari, kafir, sorgo, etc.)
Lespedeza
Lettuce
Millet
Mustard
Oats
Parsnip
Peas
Radish
Rice
Rye
Soybeans
Spelt
Sudan Grass
Sunflowers
Turnip
Vetch
Wheat

McCORMICK-DEERING
Harvester-Threshers . . *For All Grains and Seed Crops*



The Expeller
CHECK-UP SYSTEM

Yes, the Expeller has a check-up system of its own. At frequent intervals Anderson representatives call on plants using Expellers. They check up on the production, on the quality and percentage of oil and meal produced. Often they send samples of both oil and meal for qualitative and quantitative analysis. If there are any difficulties encountered, they iron them out, with or without aid from the plant. It's this constant check-up of Expeller production plus the Expeller advantages of a greater capacity, larger oil production, higher quality meal, less overhead and less labor that have led more soybean oil mills to install Expellers than all other types of equipment combined. Write today for complete information on the Anderson Super-Duo Expeller for pressing soybeans.

THE V. D. ANDERSON CO.
1958 West 96th Street • Cleveland, Ohio

ANDERSON SUPER-DUO EXPELLER

IT'S THE CALCIUM . .

(Continued from page 8)

ents like calcium, potassium, magnesium and other substances is appreciable. It was demonstrated by means of better soybean growth, nodulation and nitrogen fixation, that placing the calcium on a small amount of soil to saturate it highly is more effective than is placing it on much soil to increase the soil saturation only slightly.

These effects from variable degrees of saturation of the clay by the plant nutrient demonstrated similar results regardless of whether the variable calcium was accompanied by acidity or by neutrality. The soybean growth proved that it was not the acidity that disturbed plant growth. but that it was the deficient soil fertility commonly present when soils become acid. Likewise it demonstrated the more efficient use by the plant of the applied calcium in a soil more highly saturated by it. It also suggests a higher efficiency for drilling soil treatments than for broadcasting them.

That calcium is needed for the legume bacteria as they live independently of their host has become a well known recognized fact. With limited lime supply they become abnormal, and fail to inoculate. But given plenty of calcium, they grow well and are effective inoculators.

Unless both the plant and the bacteria have access to calcium, effective inoculation can not be expected. Lime for a legume—even an "acid tolerant" plant like the soybean—plays a helpful role because it nourishes the plant rather than because it removes soil acidity. Even an acid soil must supply lime for successful inoculation and growth of the soybeans.

Phosphorus

Phosphorus, like calcium, is a requisite if soybeans are to be active in nodule production and in nitrogen fixation. But its importance and behavior are closely related to the amount of calcium. Unless calcium is amply supplied, soybeans are poorly nodulated, and are poor nitrogen fixers for soil improvement. In fact they may even lose phosphorus back to the soil, so that the final crop will return less phosphorus when harvested than was in the planted seed.

Magnesium

That magnesium should be helpful toward better soybean inoculation has not come to our attention because relatively little magnesium is required by the plant, and most soils are not seriously deficient in this nutrient. This element is effective on soybeans, but probably indirectly as well as directly. It makes calcium more effective, and thus illustrates the fact that fertility elements work together. These effects suggest an interstimulation among the elements, so that the final results can not be considered, merely as additions of the values of their effects when applied singly.

Potassium

Improved inoculation may also be dependent on the potassium supply in the soil. Experimental studies demonstrated increased nodule production and better growth as potassium deficiencies of the soil were remedied. With more liberal amounts of potassium, however, particularly in contrast to the amount of calcium, inoculation may be less effective and give reduced nodulation and nitrogen fixation. Excessive potassium in relation to calcium makes the soybeans produce more tonnage, but they fix less nitrogen and become more clearly non-legumes than legumes. They move into the class of woody vegetation, and out of the class of vegetation with high protein content of high nutritional value as animal forages.

Inoculation, or the introduction of nodule bacteria with the seeding of the soybean, is not necessarily a practice that will compel the plant to accept the companionship of the bacteria. The latter can not use cave men tactics. Rather, the plant and bacteria will unite in their efforts toward getting their necessary nitrogen out of the gaseous supply in the atmosphere only when the soil provides liberally of all the nutrient elements required by both the plant and the bacteria.

Successful soybean growth on soils of declining fertility can not be guaranteed simply by the introduction of a few particular pedigreed microbes. The plant must first be healthy because it is well fed with calcium, phosphorus, magnesium and other soil-contributed elements. Unless it is well nourished by the soil, the inoculating bacteria will not associate with it to give it the one distinguishing character so desirable in legumes, namely, nitrogen fixing capacity.

Inoculation, or the introduction of the bacteria, is no substitute for the high levels of soil fertility that are demanded for successful legume crops.

You Get Both { Low Price / Long Experience

in This Better-Built Combine for

SOY BEANS

If you have BOTH soybeans and small grains, this Case Model F combine is the type to fit your farm because it is built from the beginning for BOTH. It takes a 54-inch swath. What's more important, it has capacity to take care of what it cuts... capacity to thresh, separate, and clean the seed... even in heavy, tough, tangled crops. The "F" gives you capacity where it counts... and gives it to you at a low price.

To do BOTH calls for special skill and experience. Case has been building grain-saving machines for 99 years. Whether you choose the "F", the six-foot "A-Six", or one of the 8, 10, or 12-foot Case combines, you get the benefit of the longest and broadest world-wide experience in saving every sort of threshable crop. In any size you get a cylinder properly proportioned for first-class work BOTH from the windrow and in standing crops. See your Case dealer about them.

You Get More for the Money in Any Case Machine

In Case bean-and-beet planters, narrow-row cultivators, and Seedmeter drills you will find features of extra value for soybean culture, yet they cost no more. Case Centennial plows and Power-Control disk harrows prepare better seedbeds with less time and bother. Ten new models of Flambeau Red Case tractors offer fast, low-cost power for every type and size of farm. Write for free folder on any machines that may interest you. J. I. Case Co., Racine, Wis.

CASE

SEE THEM AT YOUR NEAREST CASE DEALER

MULL-SOY

REG. U. S. PAT. OFF.

SOY BEAN MILK-SUBSTITUTE

This palatable, nutritious, and well tolerated soy milk is especially suitable for infant feeding, but will be found of definite value where ever cow's milk is not tolerated.

An ethical product sold by prescription pharmacies everywhere.

Ask your doctor!

Accepted
Council on Foods
American Medical Association

The
MULLER LABORATORIES
3156 Frederick Ave.
BALTIMORE • MARYLAND

DANNEN'S Soybean Oil Meal

● This modern mill has an annual processing capacity of 1,000,000 bushels, furnishing you a year 'round market for the soybeans you raise—furnishing also a high grade protein feed for your livestock. Use Dannen's Soybean Oil Meal made from the beans you grow.

Dannen Grain & Milling Co.
ST. JOSEPH, MISSOURI

FEED LITERATURE

The kind that moves tonnage because it talks authoritatively . . in the feeders' own language

Our organization specializes in printed advertising for the agricultural field. We have been serving hatcheries, feed mills, implement and equipment manufacturers, and other agricultural advertisers for over 19 years. Our service is complete — from originating the ideas to delivering expertly printed or lithographed copies of mailing cards, folders, booklets, catalogs, displays, etc. We are in close touch with marketing factors and feed research so that our selling ideas will be sound. We have a unique file of advertising photographs (which we are adding to almost daily) and we are pioneers in bringing "Vitachrome," our full, natural color reproduction to this field. Because the sales literature we prepare gets consistently good results we have attracted customers as far distant from our home state as New Hampshire, Pennsylvania, Texas, and many intermediate states. . . . Isn't there a good possibility that such a service would be valuable to you? We'd like to tell you about it in detail and send you samples of our work — all with no obligation whatever. Just drop us a card.

STEWART-SIMMONS COMPANY

WATERLOO, IOWA

PLANNING . . WRITING . . ILLUSTRATING . . AND PRINTING OF AGRICULTURAL ADVERTISING LITERATURE

Neither snow . . nor storm . . nor gloom of night stays the All-Crop Harvester from the swift completion of its appointed rounds

ALL-CROP HARVESTER
Handles Soybeans with Rubber Gloves

MODEL 40
FOR 1-PLOW POWER OR LARGER

Ample capacity for 40 acres ripening at one time, 100 acres of all crops yearly. No auxiliary motor needed. Like Model 60 has quick-adjustable reel, somersault *air-blast* separation.

"Shock absorbers" for beans are built right into the All-Crop Harvester. *Rubber-against-rubber* shelling contacts, more than any other development, quickened the march of soybean direct-harvesting . . . for that matter, the march of soybean growing itself.

Crackage . . . once a word that made the soybean grower wince . . . is now largely overcome. Once beans did the splits. Now they hit harmlessly against a cushion of rubber. The wide bar cylinder doesn't mince moisture into the seed — witness the scene above . . . a Kensett, Iowa, farmer harvesting snowbound soybeans at night last February!

At right the famous close-cutting header lifts up a tangled mat of lodged beans. Conditions like these show what stuff a combine is made of.

MODEL 60
FOR 2-PLOW POWER

Famous Quick-Speed Changer varies cylinder speed with a crank, has low range for beans. "Rubberized" drapers take punishment of coarse bean stalks

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

TO BETTER LIVING
TO BETTER FARMING
TO MORE PROFIT

YES—YOU CAN EXTRACT

More Pounds of Soybean Oil

PER BUSHEL WITH

SKELLYSOLVE

TODAY the eyes of the soybean processing industry are turning to solvents. Higher oil prices are putting a premium greater than ever on the extra *pounds* of oil which can be taken from each bushel of soybeans by the solvent method. New processes enable the solvent processor to tailor-make his meal for any desired use, feeding or industrial.

The Skelly Oil Company has anticipated this growing interest in solvent processing of soybeans, and today is prepared to supply a type of Skellysolve especially adapted to the efficient and economical extraction of soybean oil. Skellysolve's reputation is built on years of experience in the manufacture of all kinds of petroleum hydrocarbon solvents. Write or wire today to the address below, for complete information on Skellysolve Service. There is no obligation.

SKELLYSOLVE *for the SOYBEAN Industry*

There are six different types of Skellysolve which are especially adapted to the efficient extraction of corn germ, soybean, cottonseed, meat scrap, and other vegetable and animal oils. The Skellysolve that is especially refined for extraction of more oil from each bushel of soybeans has the correct boiling range and other special properties which meet the exacting requirements of this particular service.

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.